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NEWS IN BRIEF

Bonus for council staff

DIFFICULTIES in recruiting computer staff following the break-up of the Joint London Computer Consortium (CW, March 30), of which it was a member, have prompted Bexley Borough Council to offer a "completion bonus" to its permanent computer staff if they stay with the council at least until it begins operations on an IBM 370/138 next March.

"We are understaffed by about seven people," said a council spokesman, "and because of this had to take on contract staff. Our permanent staff will share between £70,000 and £80,000 in bonus payments while the contract staff will cost us about £170,000."

Good start

INTRODUCED by Computer Ancillaries in April, the new Mael 5000 multi-terminal microcomputer from Insel of Italy has got off to an excellent start, winning UK orders worth £200,000 in the first two months of marketing.

Membrain order

AN ORDER for four of its MB 7700 range test systems has been placed with Membrain by the RAF for its Avionics Repair Centre near Chester. They will be used to test and diagnose a wide range of printed circuit boards automatically.

GEC picks Trend

PAPER tape readers worth a total of £21,500 have been ordered from Trend Communications by GEC Computers. The readers are a mixture of 350 and 700 chps models and will be used with GEC 2050 and 4000 series computers.

IBM hits at European govt procurement policies

CRITICISM of European government procurement policies and the principle of single tender contracts, has been voiced by top IBM executives in Paris and Vienna.

M Jacques Lamonnier, the new managing director of IBM France has expressed concern at the slow growth in IBM's public sector business there.

Commenting on the French policy of favouring CII-HB for government business, Lemonnier is quoted in Le Monde as saying: "Today the technical judgments of public service users are perverted in order to obey the directives of the Ministry of Industry. Our engineers cannot understand why the government favours imported machines over machines built in France (a reference to the fact that IBM builds the 370/138, 3031 and 3032 in France, while CII-HB Level 66 machines come from Phoenix or Scotland at present, although they are to be built in France shortly).

"This practice of guaranteeing orders to one company is a complete negation of the principles of free enterprise which the government has been enunciating for several months," he adds.

In Vienna, Kap Kaseoni, administrative general manager of IBM Europe, made a similar point, although carefully avoiding mention of any specific government.

"In a number of European countries," he said, "we have seen different forms of preferential treatment of so-called national DP manufacturers in procurement decisions for DP equipment.

"We think that these practices are detrimental to all parties concerned the user of the equipment as well as the protected supplier. We feel strongly that public procurement should award bids on the merits of the individual offers.

"If government support is considered essential, we think it should be offered in the form of subsidies for R&D rather than through guaranteed contracts. The DP industry is technology-driven and future success is possible only through technical leadership."

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A step closer to world viewdata

WORLDWIDE viewdata has been brought a step nearer by the definition of an X75 protocol for interconnecting X25 packet-switched networks.

An X25 network is the logical medium for transmitting viewdata traffic, and the Post Office is considering use of the forthcoming public packet-switched network for its Prestel viewdata service.

Although not yet formally approved, the network is due to come into service late next year. Delay in seeking approval does not imply any hold-up in implementation of the network.

Proposals from the industry for design of the network have been invited and are due next month, and the Post Office feels that until these have been studied, it is not possible to put up a realistically costed proposal to the board.

It is clear, however, that if the target date of late 1979 is to be met, existing packet-switching technology will have to be used. Among the possibilities are the CP-50 switches used on Transpac, and Telenet Corp's Telenet Processor (CW, July 21, 1977).

The French Transpac network, which was to have begun service this month, is now due to start in October, and is scheduled to offer service from an ambitious 12 exchanges from day one.

Euronet, which is being built by CEPT, the Conference on European Posts and Telecommunications, on behalf of the EEC, is due to begin service shortly afterwards.

Based on Transpac technology, Euronet includes two additional features. Where on Transpac, all connections are billed as reverse charge calls on the computer being called, Euronet has to bill terminal users, and therefore needs to include facilities to process user identity data. Also, since Euronet is a multi-national network using the facilities of several PTTs, there is a need to collect and process data on traffic flows in order to calculate payments to each PTT.

Active consideration is being given to making the UK public packet-switched network the medium over which Prestel viewdata subscribers will communicate with the Prestel computers. An experiment to link Prestel terminals in the UK to the West German Bildschirmtext system is planned, and it is hoped that the link can be made via Euronet. The Bildschirmtext system is based on Prestel software and licences bought from the Post Office.

For the public packet-switched service, the Post Office is planning a charge of not more the 0.05 pence per packet, with additional standing charges for connection.

Racal 52% expansion—but Plessey dogged by misfortune

YEAR-END results from Racal and Plessey indicate that, while Racal Electronics continues ahead, Plessey still has a long way to go to realise its full potential.

Pre-tax profits at Racal for the year to March 31 were up 52% at £49.8 million, on a turnover up 50% at £183.3 million. Data Communication, including the revitalised Racal-Milgo, was a major contributor, but tactical military radio equipment led.

While everything Racal touches seems to turn to gold, Plessey seems dogged by misfortune. In recent years, cutbacks in Post Office orders for telecommunications equipment have been a major setback. This time the Garrard turntable subsidiary turned in a £5.2 million loss which reduced a potential 20% improvement in pre-tax profits to a meagre 6.3%.

● Ferranti's figures, out this week, are expected to show a strong profit advance, and next week the company is to apply for listing of its shares on the Stock Exchange, following which the NEB will reduce its stake from 62.5% to 50%.

'God's gift to services industry'

MICROS are God's gift to the services industry. So declared CAP chairman Alex d'Agapeyeff speaking at the First World Computing Services Congress in Barcelona last week. He was hitting back at many delegates who had said that they were worried about the spread of micros.

"The key to computing now and in the future is software," said d'Agapeyeff, pointing out the enormous business opportunities for software houses that there would be when everyone had his own computer.

Other speakers expressed the view that there would be plenty of demand for services which bureaux could provide, particularly in back-up and large-scale storage, while big discs remained out of many customers' price range.

Third World theme

THE use of computers in agricultural planning for Third World countries is the theme of next Wednesday's meeting of the BCS Specialist Group for developing countries. The meeting will be held at the London School of Economics, starting at 6pm.

Software answer to Extended Facility

THE answer from Amdahl to IBM's Extended Facility for the MVS operating system has been announced for delivery in October. Where IBM's Extended Facility is implemented in firmware (CW, May 4), Amdahl's product, called MVS/SE Assist, is software.

The Extended Facility, which is standard on the 3030 series and an option on the 370/168 and 158, enables users to run an enhanced version of MVS called MVS/SE, for Systems Extension.

Amdahl's MVS/SE Assist is the only major software product so far introduced by the company, and is claimed to improve throughput by about 12%, and runs on all 470 models.

IBM charges $1,250 a month in the US, £951.30 in the UK, for MVS/SE, and Amdahl users will have to pay this rental fee to IBM in addition to the $250 a month to Amdahl if they want to run MVS/SE on 470s.

The availability of the MVS/SE Assist software raises the possibility that Amdahl could offer it to IBM 370/158 and 168 users as an alternative to the Extended Feature for MVS/SE. To pay Amdahl $250 a month looks an attractive alternative to paying IBM between £9,480 and £47,000 for the Extended Feature.

Amdahl says that MVS/SE Assist has not been tested on a 158 or 168, and that there are no current plans to offer it to IBM users.

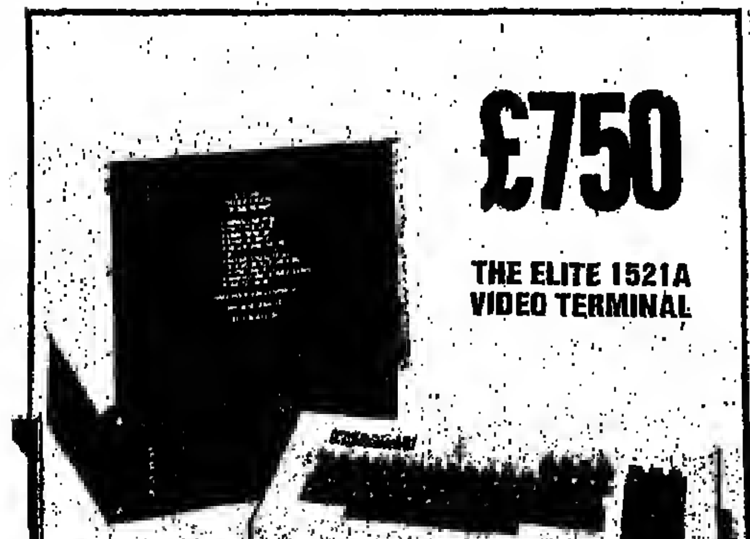
'Draw more on govt research'

THE Parliamentary Under-Secretary of State at the Department of Industry, Leslie Huckfield, has called for industry to draw more on the resources of government research establishments.

Speaking last Friday at the launching of the first review of the DoI's six research establishments, Huckfield said: "The technologies developed in the laboratories must be transferred to industry . . . by staff working hand in hand at the laboratory firms or by laboratory specialists joining companies as permanent members of their staff."

Commenting on Huckfield's remarks, the National Physical Laboratory said that it was already involved with industry in many projects. One example quoted was the Demos multiprocessor computer being developed with Scicon (see page 3).

'Research Establishments Review 1978' is available free from the Department of Industry Library, Abell House, John Islip Street, London, SW1. Tel. 01-211 6221.



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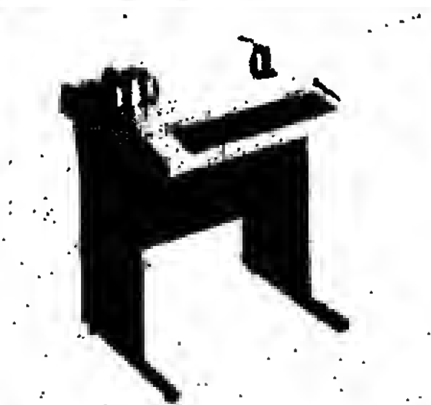

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Briefing

Threshold future in doubt

THE National Computing Centre's Threshold training scheme for young people may not continue after May, 1979 when the special measures under which the Manpower Service Commission funds it, expire. Threshold does not fit in with the MSC's current Young Opportunities Programme because its courses are too long and at the wrong academic level.

The MSC pointed out that after the first two years of Threshold it was intended that industry would take on the cost of the scheme. The NCC has submitted an amended syllabus which is being considered by the MSC.

Into China

WITH orders from the Peking University of Science and Technology for an 1100/11 and from the Peking Document Service for an 1100/12, Univac has broken into the Chinese market. The orders total $6 million and follow an order to IBM for a 370/138 for a turbo-fan plant (CW, June 1). All three will need CoCom approval.

Seminar repeat

THE highly successful seminar "IBM — the next five years" held last March and organised by Infotech is to be run again from September 11/13. The subjects will be similar but most of the speakers will be different. The venue is the Greenwood Theatre, London SE1. The fee is £310, with a 5% discount on bookings made before July 14.

Home micro

RESULTS of market surveys will allow Hitachi to decide how and when to put its new home microcomputer on the market. First shown at the Tokyo Good Living Show, last May, the system is designed to interface directly with a TV, and is intended for controlling central heating systems, housekeeping budgeting and daily menu preparation.

Fight for control

AFTER two months of indecision, Northern Telecom of Canada has decided to fight US aerospace manufacturer McDonnell Douglas for control of Data 100 of Minneapolis. The Canadian firm, which already has 31% of Data 100, is offering $19.25 per share for the remainder. McDonnell Douglas is bidding $17.50 cash or $20.50 in bonds, convertible some time in the future (CW, May 25).

Automatic fares

IF permission is granted by the GLC, London Transport will soon be inviting tenders from outside companies for the development of its £55 million automatic fare collection system (CW, August 11, 1977). London Transport hopes that the new system will reduce the £8 million annual loss of revenue that stems from fraud by users of the underground railways.

Model welcome for first 2950

WHEN ICL delivered the first 2950 on schedule to bra and swimwear manufacturer Berlei (UK), model Juliette was at the company's Slough, Bucks, head office to welcome the machine. She was wearing one of the latest Berlei developments, a swimsuit called Secrets. On a different software front, programmes on the 1 Mbyte, £390,000 2950 will be used to develop online systems under VME/K and some 1,000 programs will be run under DME/3 emulation.

Berlei factories at Merthyr Tydfil and Portsmouth will be linked to the system by 7502 processors and direct links are also planned from the company's five other UK plants.

ICL is now delivering 2950s at a rate of two a week, with eight of the first 10 going overseas.

Halifax cash card threat to major banks

IN a move which could seriously challenge the competitive position of the major clearing banks, the Halifax Building Society is evaluating an IBM online cash dispenser at its head office, in Halifax.

The society is the UK's largest, with 952,008 borrowers' accounts, over five million investor accounts and 360 branches. The planned pilot trial is still in the development stage, but the society intends to start an in-house service for staff use in the autumn. If the results of this are satisfactory, it will consider a pilot service to customers in a few branches.

If a cash dispensing service is offered it is likely to be linked to a new kind of account bearing a very low rate of interest, but no firm decision has been taken.

The clearing banks are already suffering from the fact that building societies are open on Saturday mornings when all the banks are closed, and the advent of cash dispensers from building societies could be another blow.

As soon as one society introduces dispensers, others are likely to follow and some societies, such as the Britannia, have designed their networks from the ground up to be capable of adding cash dispensers if and when they are needed (CW, June 3, 1976).

The Halifax is unique among building societies in that it already offers a small-scale deposit cheque facility, mainly for staff members. However, the special accounts are also available to wives of staff members and to former staff, and there are about 10,000 such accounts altogether. It is on these accounts that the dispenser will be tested initially.

The dispenser under trial is

● Turn to page 8

GEC walk-out over sacked ops

A STRIKE took place this week at the GEC Stoke, Coventry plant in support of 18 operators at the site who were sacked on Monday, following four months of disputes with the company.

All ASTMS members at the plant walked out after a mass meeting on Tuesday morning, expecting to return tomorrow (Friday).

A meeting of AUEW/TASS members late on Tuesday afternoon was also expected to support a two-day walk-out, although the result of this meeting was not known at the time of going to press.

The company sacked the operators after giving them the option of reporting for work at 9.30 am on Monday, July 3, or being dismissed.

On Monday, a spokesman for the company said, "The operators did not turn up for work this morning and so their contracts with the company have been terminated."

The dispute is still an official ASTMS matter. Last Friday a meeting took place in Coventry between the operators and Tim Webb of ASTMS who suggested that they should agree to take the matter to arbitration. They refused.

The dispute, which started on February 24, and became an official ASTMS matter on March 20, arose because the operators are unhappy with the improved terms of pay offered by the company. The company offer comprises an increase in shift allowance from 25% to 27½%, and increments in basic salary of £2, £3 and £4 per week for operators, senior operators and shift supervisors, respectively (CW, On Spot, March 30).

PoS preview in North

SUPERMARKET point-of-sale systems from ICL are now in operation at several locations in the North of England, according to ICL's retail systems sales manager, Mike Pollitt. As yet unannounced as standard ICL products, the systems operate online with a back office computer and provide facilities such as price lookup.

US error relegates ICL in 'league table'

AN error in a major US survey has seriously downgraded ICL's position in a "league table" of computer companies.

The survey, conducted by Arthur D. Little Inc and published in the June issue of the American monthly publication Datamation, attributed to ICL a turnover of $233 million in its 1977 financial year and bottom place in a list of seven non-US companies, behind Fujitsu, CII-HB, Hitachi, Siemens, Nippon Electric and Nixdorf (in that order).

The report does not reveal the exchange rate used, but $233 million would be, at most, about £130 million. In fact, ICL's turnover for the year ended September 30, 1977, was £418 million, which is over $730 million at the current rate of exchange and close to the $765 million attributed to second place CII-HB.

In the survey of US companies, Texas Instruments and Amdahl showed impressive gains over the previous year's tables.

● Full report, page 6.

COMPUTER WEEKLY'S INSIDE NEWS

The analyses and other complicated routines needed for the financial management of business can be provided quickly and accurately by well designed computer systems. This week's special section deals with computers and the accountant (pages 11/13) . . . Features on other pages include the adventures of a job hunter (page 4) . . . A second look at the virtual machine (page 14) . . . Sir Keith Joseph answers some more questions in Letters to the Editor (page 14) . . . There's another view of the future in Computerstyle 2000 (page 15) . . . Tim Palmer reports from India (page 18).

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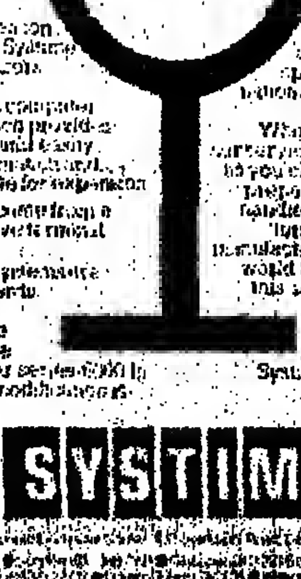

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Data should become an open secret

THE fear that computers will become an all-pervading tool to pry into private lives has been heightened by a new piece of mass media "investigation" into the privacy issue.

In an article in this week's Sunday Times "for the first time," it is claimed, there was a description of how the network of government databanks could be moving to a centralised "Big File" of 1984-style dimensions.

Although, right at the end, the article does admit that computers in themselves are not a threat to privacy, its mixture of pseudo-researched "in-depth facts" and journalistic anti-computer "shock-horror" provides a further unhelpful contribution to the vital debate on how society should face up to the impact of information technology.

In a society based on computers and other forms of information technology, it must be accepted that vast quantities of information on individuals will be gathered, and stored on computerised systems and that access will be feasible by anyone with the right password — and anyone desperate enough is likely to be able to find that key.

Instead of trying to delude ourselves that we can produce laws and rules and systems that can protect privacy, there should be a revaluation of what we mean by private.

If society becomes more open and people become more open with each other, there will be fewer secrets and therefore fewer worries about "private" information being accessed.

At present, the greatest threat to personal privacy — from both State and commercial organisations — comes not from the computer but the electronic bug. Yet most people willingly give away the most important information for a "bugger" — the private telephone number and address — in the phone book.

The complexity of modern industrial society can now only be met with the assistance of computers to process the huge volumes of information needed to keep society working.

The danger of articles like that in the Sunday Times is that they misdirect attention from the real issues. On the question of privacy there is only one answer — to ensure that political power does not fall into the hands of people who want to invade privacy for evil reasons.

It is clear, for example, that police forces must be equipped with modern technology to fight crime. It is the duty of all those who believe in a free and orderly society to ensure that the police force always remains under the control of democratic processes.

For it is only in the protection of liberty, free speech and the checks and balances of a democratic society that there can be any safeguard of personal privacy.

Unfortunately, however, it seems that SCUM, the Society to Cut Up Machine-makers, mooted by Professor Donald Michie in Guest Computerview last week, is likely to gather momentum until the mass media stops finding evil computers at the root of everything, from creating millions of unemployed to unfairly finding out a lady's age from her driving licence.

FOCUS

HAVING provoked half of the operators in the country — the other half being presumably too busy or disinterested to get involved — Focus now turns its attention to the programming profession.

It seems that Edward De Bono of "lateral thinking" fame has also been contemplating the world of programming. However, his customary lateral viewpoint seems to have presented an unrealistic picture. To suggest, for instance (CW, June 15) that too much emphasis is placed on printing legible characters on coding forms, is a theory which deserves a horizontal boot.

DP managements are well aware of the general lack of productivity achieved by their program teams. It is unfortunately a fact of installation life that only 25% of programmers' time is spent actively programming. Much of it is taken up with rewriting, in legible format, sundry coding sheets or deciphering them for the benefit of the input team.

Evaluating productivity in the region of programming is not as basic as keeping tabs on operators. Should the operations team pause for a coffee break — not that this is a standard routine — the fact is logged and duly documented. Should, however, the programmer desert his post for the delights of the coffee machine — or the latest punch girl — the fact will not go on file.

Likewise, if the programmer powers down early, no one takes much notice. The DPM, on discovering an empty office, blandly assumes that the entire team is out on user location or at a manufacturers' briefing. His tolerance, however, does not extend to a deserted room.

De Bono suggests that a broader view of DP problems should be taken. There is often more than one solution to a problem — ones which can be developed in mere 10 minutes of highly charged lateral thinking. Encouraging the programming team to discover alternative solutions is not necessarily one which will commend itself to many DPMs.

In any case, most operators are happy masterminding their equipment responsibilities without having to indulge in bouts of lateral thinking. Inefficient programs they can deal with, but advanced level applications are a pain in the main core.

Meanwhile, methods of improving programmer productivity remain high on many DPM's thinking pads. There is no time for thinking laterally or even "top down". The more conventional procedures include the buying-in of ready made packages, thereby freeing the team from re-inventing the basic application wheel. Providing the programming team with back-up support in the shape of a program librarian is a well known method of improving productivity.

One other neglected area is the basic improvement of source codes. A CPU saving in excess of 30% can often be achieved from a concentrated dose of diligent reprogramming.

If operators are the forgotten race then the programmer is the taken-for-granted equivalent. Programmers are well conditioned to being ignored when all is going well. But they are first in the firing line following a rash of faulty operating systems or a new generation of software bugs. It is certainly the case that programmers, unlike their analyst colleagues, seldom get their views aired.

Ten years ago...

COMPUTER WEEKLY JULY 4, 1968

Sir John Wall, deputy chairman of the Post Office Board was named as new chairman of ICL . . . Britain's first Institute of Cybernetics was planned for Brunel University . . . A sailing boat following a course programmed on an English Electric KDF9 won the Observer single-handed transatlantic race . . . The BBC planned a message switching and control system which would automate many of the technical aspects of broadcasting . . . Concern that the GPO's plans for a future data transmission network might prove inadequate led to the formation of an ad hoc ginger group, the Real Time Group . . . Plans for a South-West Universities computer grid met with delays partly due to uncertainty about ICL's future development of System 4.

INTERRUPT

A FURTHER education college lecturer bought a BCPL compiler. He got it to work, but found that the mechanism which automatically inserted the declarations for accessing library routines at the head of the program was misbehaving. The routines were being declared, but attempts to refer to them in the program were faulted.

Disquieted, he telephoned the person who supplied the compiler. It transpired that the file containing the library declarations was typed in lower case letters, but the college teletypes only had upper case. Unfortunately, the compiler accepted upper and lower case identifiers, but treated them as distinct entities.

Consequently, lower case routine names had been declared, but as the references were to upper case names the compiler wouldn't match them.

Moral: Check the evidence before you press your case.

● This week's £5 Interrupt prize goes to Greg Michaelson of Napier College of Commerce and Technology, Edinburgh.

Siemens introduces a fast hand-held scanner

POINT-of-sale terminal systems are one of the most important application areas for the HL 5 hand-held OCR scanner introduced by Siemens. The HL 5 can read 32 different OCR-A and OCR-B characters at up to 140 chps.

The characters can be generated by a line printer, matrix printer or ink jet printer, by labelling equipment, plastic card imprinting or letterpress printing.

Characters are read by passing the HL 5 scanner over the line in either direction and are recognised by microprocessor based logic that resides in a separate unit linked to the scanner by a thin cable. Data can then be transferred to the host terminal via a suitable interface.

The HL 5 looks like a serious competitor for the Recognition Equipment hand-held OCR wand, which has been purchased in large volumes by PoS system suppliers like NCR.

PO engineers' ban could hit telecoms users

COMPUTER users could be hit hard by an overtime ban by Post Office engineers, which started last Friday.

This follows a stepping up of industrial action begun last October by the Post Office Engineering Union, in support of negotiations with the Post Office, which have been under way for seven years, for a 35-hour week.

Installation of data lines and Post Office telecommunications equipment is likely to be increasingly delayed by the engineers' dispute.

Companies moving offices or needing to expand their communications facilities are likely to be particularly badly affected, but repairs and maintenance will also be affected if the situation continues to deteriorate.

Since 1971 the engineers' union has been trying to negotiate a reduction to a 35-hour week from the 40 hours now worked. Other staff in Telecommunications Division work 36 to 37 hours.

The Post Office says that engineers in other industries work a 40-hour week and it does not want to set a precedent in reducing it.

According to the POEU, the only previous industrial action taken in its 95-year history was a one-day stoppage in 1969, and after seven years' negotiations on this issue members are feeling bitter.

A Post Office spokesman said that this action, coming within days of Lord McCarthy's investigation of the union case, is unacceptable to the Post Office.

Lord McCarthy has been asked by Industry Minister Eric Varley to establish how the Post Office's and the POEU's positions can be reconciled and to procure an agreement between them. He has met the union's leaders three times since the middle of June.

Many engineers, both union and non-union, work a 37½-hour week, but the dividing line seems to come between those considered to be staff and those classed as manual engineers.

The Confederation of Shipbuilding and Engineering Unions, which met at Eastbourne last week, passed a motion in favour of all member unions pursuing a 35-hour week.

Last year, POEU action started in the form of refusal to commission new exchanges or install new types of equipment, and talks initiated in January this year broke down in May.

At its annual conference at the beginning of June, POEU delegates decided that refusal to connect would additionally cover non-standard PABXs and underground line plant. This was a virtually unanimous decision, and the executive committee was also given the authority to call further industrial action.

The Post Office has responded by sending engineers home when they have refused to connect equipment, for example extra exchange facilities to handle a television outside broadcast unit. This resulted in the national overtime ban from last Friday, plus one-day token stoppages by engineers in the North of England and Scotland whenever men have been sent home.

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NCR redundancies due to 'second electronic revolution'

REDUNDANCIES threatened by NCR at their plant in Dundee were due to the "second electronic revolution" William S. Anderson, chairman of the company, has told Scottish Nationalist MP Gordon Wilson.

He also rejected claims that work was being moved to the company's German plant at Augsburg. He said that staff reductions were expected there and would probably be greater than at Dundee.

Anderson said the reasons included further technological simplification of their 8100 family of small computers and the microprocessors which drive them. The result was that fewer parts would be needed for the fabrication and assembly of the product, and that meant lower labour content (CW, June 8).

He said that as the product became more technically advanced, the labour content continued to decline.

"In such a climate of constant change, neither NCR nor any other computer company is in a position to pledge that labour requirements will remain entirely stable for any type of product or for any particular plant," he added.

It was, however, NCR's intention to build up the capabilities of their Dundee operation to produce computers and other advanced computer-based products.

Dundee was the sole supplier in Europe of the 8200 family of computers, as well as the larger NCR 8400 and 8500 Criterion series. It had also been assigned production of a variety of electronic data terminals plus a new Dundee-designed and developed automated self-service banking terminal.

Wilson, who is MP for Dundee East, said he was disappointed that Anderson had not been able to give any pledge about the labour requirements at the factories, and had not accepted his suggestion there was a need to steer additional electronics work to the city.

He said it would be wise and cautious for Dundee to look to other ways of solving its job problems, either by pressing for the NEB's new microelectronics plant, which might be sited in the North East of England, or for additional industrial investment.

ANDERSON . . . . . claims of switch of work to Augsburg rejected

Mumps 'look-alike' on Series 1 and DG

A US company closely involved in the development of the interactive data management language Mumps is to release similar software for IBM's Series 1 before the end of the year. The system, MIIS Standard, which already runs on Data General minis and micros, will also be available on Digital Equipment PDP hardware.

At the same time, the company — Medical Information Technology, of Cambridge, Massachusetts — has gained its first two direct European users in the UK.

One of these is systems and software house Marcol, which is developing a system for the Penta Hotel in London based on twin Data General Eclipses. Marcol has signed an agreement with Meditech permitting it to market MIIS in the UK.

MIIS, Meditech Interpretive Information System, first appeared in 1969 — the year that Meditech was formed. The founder of Meditech was a member of the team that had three years previously conceived and developed Mumps at the Massachusetts General Hospital.

The Meditech software, for which the company claims about 300 users worldwide, is supported on a wide range of DEC and Data General machines. MIIS Standard, a significantly enhanced version, which emerged about three years ago, has so far been restricted to Data General equipment.

In addition to the Eclipse, the new system also operates on Nova and Micro-Nova machines. An application based on the latter is already running at the US National Library of Medicine.

The Series 1 version and the first DEC version, for the 11/70, will be released in November or December. They will be followed by implementations for other PDP-11 models and the PDP-15, said Meditech.

Mumps, which Meditech describes as a subset of MIIS, was implemented originally on DEC PDP-1 computers. It was subsequently adopted by DEC as general purpose software for the PDP-11 range.

The system, which in Europe has approaching 300 users, last year achieved the rare distinction of recognition as an ANSI standard language — joining Cobol, Fortran, and PL/1.

However, the standard represented a major step forward from the latest DEC Mumps release, Version 4B. Existing users were thus faced with a significant conversion task if they wished to migrate to DEC's implementation of Standard Mumps, DSM-11.

There was for a while some uncertainty over the company's commitment to supporting two versions, though DEC now says that both will continue to be sold and supported.

With the announcement of MIIS Standard for the PDP-11, however, some users may find migration to the Meditech system more attractive. This is claimed to offer a number of advantages over DSM-11, both in facilities and performance.

Information Privacy journal to be launched by IPC

A NEW bi-monthly journal called Information Privacy will be launched by IPC Science and Technology Press in September. It will cover the technical, legal, and social issues involved with computer-based information systems and their use.

The journal will deal with hardware and software considerations of security, the needs for and application of legal controls, international data flow, etc. Each issue will contain five or six papers, industry news, international reviews of working groups, details of legislation, conference reports, book reviews, and a calendar of events.

Managing editor, Gareth Jones, has issued a call for papers in any of the fields covered by Information Privacy.

Subscriptions will cost £35 a year, but until August 31 there is a special pre-launch offer of £30 for the first year. For more information, write to IPC Business Press (Sales & Distribution) Ltd, Oakfield House, Perrymount Road, Haywards Heath, Sussex RH16 3DH.

Tories plan five-year training for engineers

A STUDY group set up by the Conservative Party has recommended that a new five-year training programme for engineers be introduced, together with a two-tier professional structure, in order to improve standards.

Dr Keith Hampson, MP for Ripon and instigator of the study, said "Britain's engineers are in danger of being the worst trained in the world, and might even be putting lives at risk. This investigation shows that not only have standards to be raised but that the whole nature of the training should change."

The committee wants two classes of engineers, chartered engineers and technician engineers. To achieve chartered status a student would take a five-year sandwich course with the academic and industrial parts much more highly integrated than at present. This would have to be followed by two years of supervised professional practice.

The new Engineering Training Council would be set up, possibly under the aegis of the Council of Engineering Institutions.

Govt 2976 goes into service

THE modularity and flexibility of the ICL 2900 line is underlined by the Central Computer Agency's new 2976 at Norwich. The machine was put together from a new 2980 order code processor and the storage subsystem, input-output unit and slow peripherals from the 2970 which the CCA ran at ICL's Bracknell offices until last September.

The now dismantled 2970 was used to provide a remote job entry program testing service to government departments.

This service is now provided by the 2976 at Norwich, but for about five months the CCA used the night shift on the 2980 at the Ministry of Defence Bureau West establishment at Devizes.

The 2976 supports ICL 7503 RJE terminals at several government departments, including the Department of the Environment at Hastings, the CCA in London, the Department of National Savings at Durham and one Ministry of Defence establishment. There are also two 7503s at the CCA in Norwich.

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MICHIE'S PRIVATEVIEW

A telegram to Leonid Brezhnev

THE 30-year-old Soviet Scientist Anatoly Scharansky is due shortly to stand trial in Moscow on a charge of treason. Before his arrest he was an active member of the Helsinki Agreement monitoring group. This group investigates the degree of compliance by the Soviet authorities with the Agreement's provisions on human rights, and takes particular interest in the case of Soviet Jews wishing to emigrate to Israel. From time to time the group circulate reports of their findings. It is this to which the Soviet government takes special exception.

Scharansky is Jewish. He is also a computer scientist. Last summer the ACM leadership protested publicly against his arrest (CW, August 18, 1977). Unfortunately these protests, instead of urging computer scientists worldwide to direct appeals to the Soviet political and legal authorities, called on them to rupture relations with their Russian scientific opposite numbers, to boycott conferences on Russian soil, to refuse to accept Russian scientific visitors, and so on.

This recommendation in my opinion was and is a tragic error. If the aim is to bring encouragement to Soviet scientists concerned about human rights, then this way of showing displeasure with the actions of their government is seriously counter-productive. As a way of influencing those actions it is at best totally ineffective.

There is doubtless some idea in mind that such measures may somehow goad or shame Soviet scientists into themselves taking the matter up with their own governmental authorities, and that Brezhnev is more likely to take note of this indirect pathway than he would of more direct pressures.

On the basis of numerous visits to various parts of the Soviet Union over the past 22 years, during which period I have also played host to a succession of Soviet visitors to my own laboratory, I can assert that such an idea is misconceived. It would after all be absurd if, shall we say, some Soviet academicians, upset at recent reports of British torture of suspects in Ireland, were to break off their relations with the Royal Society. The Fellows of the Society, and other British scientists, would be inclined to feel that foreign scientists should either mind their own business or should address their protests to the Home Secretary, the Prime Minister, or other relevant person or government office.

Why do our scientists and computer people imagine that these particular principles work any differently in the reverse direction? The assumption that they do is contradicted by numerous conversations I have had over the years with Russians of every hue in the spectrum.

The desire to hit out at fellow scientists and technologists, however well motivated, saddens and alarms me. I detect here seeds of that mindless hysteria which ends up injuring the very cause that it purports to champion. Let us not forget the cold-shouldering of Einstein by the British scientific establishment in the early 1920s. Why was he denied acceptance? Because he was German, and hence associated in people's minds with memories of the Kaiser's atrocities.

Anatoly Scharansky did his Master's thesis on the computer representation of chess end-game knowledge. As I have on occasion pointed out to Soviet artificial intelligence scientists, he is therefore my colleague, my brother.

I invite all who feel an identification either with this narrow technical concern, or with the broader community which binds scholars, scientists and engineers everywhere into a single fraternity, to add their signatures to mine on the following telegram to Leonid Brezhnev, and/or to send their own message (preferably "and").

Brezhnev, Kremlin, Red Square, Moscow, USSR.—We British computer professionals express our concern at the forthcoming trial of Anatoly Scharansky and believe advance of science and human culture to be inseparable from equitable and open judicial practice. We accordingly urge that observers from the international scientific and computing community be invited to attend the judicial proceedings — Donald Michie.

Donald Michie

Editor's note. Readers wishing to add their names to the above telegram should write a personally signed letter to the Editor, Computer Weekly, Dorset House, Stamford Street, London SE1 9LU, including a verifiable address.

SOFTWARE FILE-1

'Pursue patents in Congress'—court

A JUDGE in the US Supreme Court has indicated that proponents of software patentability should pursue the matter with Congress rather than in the courts. The recommendation was made after the Court had ruled against patentability in the Dale Flook case (Software File, May 18).

Flook's system, the subject of the case, is an improved method for monitoring permissible levels of heat, pressure, and other variables during such manufacturing processes as petroleum refining.

Voting by six to three, the Supreme Court held that the disputed program could not be patented under current patent law since its only novel feature was a mathematical formula.

The decision rested on a long-established precedent that abstract intellectual principles, such as laws of nature or mathematical algorithms, are not patentable.

Associate Justice John Paul Stevens noted that a process did not become unpatentable simply because it made use of such a formula. He insisted, however, that the process itself must be new or useful.

In this case, he said, the computer program at issue was not an "inventive application" because it employed well-established technology with the mathematical formula as its only new feature.

Justice Stevens went on to emphasise that the decision should not be interpreted as establishing that patent protection for software was undesirable. The appropriate scope for such protection was, however, a policy decision best left to Congress.

The Supreme Court's majority decision overturned the previous finding of the US Court of Customs and Patent Appeals. This court had ruled that the subject matter of the program was patentable.

The dissenting judges, complaining that the decision struck a damaging blow at basic principles of patent law, said that criteria of novelty and inventiveness had been introduced incorrectly.

The degree of innovation should be considered only when deciding whether to actually issue a patent, they said. Although a patent might well be ultimately denied, Flook's process in their view clearly met the standards set for subject matter patentability under the current law.

Store, retrieve system for alphabetically indexed data is launched in UK

NEWLY-INTRODUCED in the UK is a system for storing and retrieving alphabetically indexed data. The On-Line Alpha System, which operates under all versions of IBM's DOS and OS, originates from Insurance Systems of America Inc and is available here from Lonsdale Systems.

The software is particularly well suited to applications which need to access large files or databases using an individual's name as the search key.

Typical users in this mode would include banks, insurance companies, public utilities, and local government departments, which face the problem of having to make inquiries when the customer or account holder does not know his customer or account number.

On-Line Alpha provides operators with flexible facilities for master file searching. A search can, for example, be initiated with as little as last name only — or part of the last name — and the system will return all potential matches.

Because it uses automatic phonatic encoding, the system is tolerant of spelling mistakes: a search on the basis of an incomplete key will also return most sound-alike names.

On the other hand, where complete information is available, secondary identifiers such as date of birth can be used to make an immediate "hit" very likely.

Updatable both in batch and online mode, On-Line Alpha can be implemented either as a stand-alone system or as a subsidiary index to existing master files.

In the latter mode, records would contain a logical pointer into the main application files. The system provides user exits through which such linked records can be accessed.

Written in assembler and supporting QISAM, BISAM, BDAM, BSAM, and QSAM, the software is said to execute in a 32K partition under any TP monitor. It will sell in the UK for £21,000 providing a 20-year licence.

Lonsdale is the UK subsidiary of SDI Associates of Toronto, a major Canadian computer services company. The company was formally incorporated in the UK earlier this year, following four years' operation as an SDI branch office.

The company is based at Prudential House, Wellesley Road, Croydon. Tel: 01-681-3021.

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PROGRAMMER NOTES

Bug-free library can give greater control of I/O

LAST week's Programmer Notes contained the start of a Do-It-Yourself Input/output library article. This episode continues the OPEN statement format, so it is best read in conjunction with last week's Notes.

It is usually possible to create files with varied READ-WRITE attributes. Programmers should be encouraged to explore the possibilities of limited READ and WRITE account names being used, rather than a blanketing NONE or ALL.

Expiry dates should only be present when a new file is being created and should conform to installation requirements.

Possible extensions to the OPEN and CLOSE routines include parameters corresponding to the unit number and status flag. This type of command would use any defaults or previously introduced file attributes, but remember "insufficient information" is a valid error message following a system request in those conditions. A DESTROY file routine could be incorporated as a secondary entry point to the CLOSE ROUTINE.

It is a good idea to split the status-flag value into several categories, to make for faster analysis, eg 103 could mean an illegal third character in the file-name, 204 an illegal fourth character in the password, 1 file is already OPEN, 2 file does not exist, 3 conflict of READ/WRITE privileges etc.

Record handling routines can be broadly divided into READ, WRITE, SEARCH or POSITION and DELETE. Simplistic versions of the argument lists would be needed for sequential access and a slightly more complex version for random files. But keyed files are becoming more popular and it is on these that Programmer Notes will concentrate.

A suggested READ statement would have the format READ (unit number, key, buffer, length of record, status/direction). The last parameter is optional, and unit-number is self explanatory.

The "key" argument needs careful implementation. To insist on a key of the form "8Z03C1F1F3" meaning a three byte key of "A01" is ludicrous. This may mean a KEYMAKE routine is required for the library. Increasing tendencies towards major and minor keys could mean the READ and WRITE routines should recognise the differences.

In certain cases a file may have an associated maximum key value, possibly set up at file opening or as a systems standard, so the key should be checked.

A different form of the READ statement handles sequential reads on a keyed file and in this case returns the key.

Buffer and length are self explanatory, although it is good practice to encourage programmers to use an explicit buffer area. Although length can be a request for more bytes than are physically present, the parameter should be returned with the actual value, after the read.

Status could include: non-existent major/minor keys; loss of data; end-of-file; null file; file not open/non-existent. The latter may be overcome by performing an implicit OPEN.

The optional direction parameter would be used with the sequential READ on a keyed file and has the values forwards or backwards. Forwards is also the default.

The WRITE routine is the same as READ, only a key must always be supplied and the "overwrite" parameter can be used. Overwrite is a good security measure. If an identical key to the one being written exists, the routine either automatically overwrites the record, or reports the fact via the status flag.

The record POSITION and DELETE routines are simpler, needing only the unit number, key and status flag. Implementers should delve into their system file handling to see whether a read of a non-existent key will cause the next read to be made at the key logically after the non-existent key or at an arbitrary point.

A bug-free and efficient implementation of the library, suitably annotated and enhanced, will offer applications programmers more control over their input and output and for the end-user an easier means of communication with the dreaded computer.

Puzzler

THIS week's alphametic is not only "true" but also the widest ever! Seventy-seven is of course an odd number, and all ten digits are involved. See Page 45 for solution.

```
SEVENTYTHREE
         TWO
         ONE
         ONE
------------
SEVENTYSEVEN
```

SOFTWARE FILE -2

EDITED BY PETER HEWITT

SOFT BITS

Multi-tasking capability

A NEED to process more than one task at a time is said by Allied Industrial Services to have been the key factor in its decision to replace Informatic's small Minicomm TP monitor with the Westinghouse system, Westi.

The company, a division of the Initial Services Group, has installed Westi on its 256K IBM 360/40 in Bradford. Westi, which now has 40 European users and 400 worldwide, offers a multi-tasking capability in contrast to Minicomm's single-tasking mechanism.

A SOFTWARE development laboratory, employing about 50 staff, has been set up in California by Mohawk Data Sciences Corp. It will concentrate on developing software enhancements for the MDS Series 21.

A RELEASE date of July for the VME/K Basic compiler was confirmed at the last meeting of the VME/K user group. The software was developed by Kent University under contract from ICL.

A TALK on Concurrent Pascal and its use in the NPL's multi-Microprocessor Demos project (CW, June 29) will be given at the next meeting of the BCS Software Engineering group. An all-day meeting to be held on July 13 at Birkbeck College, it will also include discussions of system programming in Pascal-Plus and the use of the MicroSim development system.

LATEST customer for Time Utilising Business Systems' payroll package is Contact Lenses (Manufacturing) Ltd of London. The company runs the software on a DEC Datasystem 310.

CONTRACTS worth £¼ million have been received for RTZ Computer Services' fixed asset system Fascia since the release of the Mark II version. Now incorporating facilities for inflation accounting according to the Hyde guidelines, the system has over 60 users.

EXTENSIONS to the user interface are the major feature of the latest version of ADR's Roscoe, marketed in the UK by CAP-CPP. Enhancements include an extended 3270 screen handler, offering key-controlled browsing, and a complementary screen position pointer which dispenses with the need for absolute sequence numbers during file maintenance.

TWO new modules have been added by Safe Computing to its SaFeS production control package for ICL System 10 users (CW, October 6, 1977). The modules, for Extended Requirements Planning and Work In Progress, provide the facility for more efficient control of material and resources.

Accounting packs for TA 1000s launched

A RANGE of applications packages has been released by Adler Business Systems for the widely installed TA 1000 business system. Developed in the UK, the software library, Absal, provides initial packages in the areas of sales ledger, purchase ledger, and payroll.

Sales ledger processing, invoice production, and stock recording are combined in an integrated system called Assist — Adler System for Sales ledger Invoice production and Stock. Claimed to feature ease and flexibility of operation, the software also includes ancillary and management reporting functions.

The second package, Panacea, offers facilities for the control and management of the purchase ledger, and cash. The suite is rounded off with Help, a disc payroll system capable of handling hourly, weekly and monthly payrolls.

All the packages are designed for operation on the standard TA 1000 configuration including two floppy disc drives and one alpha-numeric console keyboard.

The company is at present developing systems for VDU use and also plans to offer inventory management, estate management, and production costing and control systems in the near future.

IMSL's Fortran on PDP-11s

DEMAND from existing subscribers has prompted International Mathematical and Statistical Libraries Inc to implement its Fortran subroutine library for Digital Equipment's PDP-11 minicomputer.

Consisting of nearly 400 function sub-programs in the areas of mathematics and statistics, the library was validated under DEC's Fortran IV and Fortran IV Plus compilers. Typical memory requirements are said to be 32K.

The PDP-11 version is the second IMSL implementation for a minicomputer. Last year, the library was made available for the Data General Eclipse series (CW, October 6, 1977).

IMSL's UK rival, the Numerical Algorithms Group, has also recently implemented its library on the PDP-11, as well as on a number of other minicomputers.

Available from IMSL headquarters in Houston, Texas the software carries an annual subscription charge of $1,220.

World rights for Series 1 Basic sold

A COMPUTER services company in Kuwait has acquired worldwide rights outside North America to the only Basic interpreter so far developed for IBM's Series 1.

The software, Basic/1, was developed by Grand Computing Enterprises of Birmingham, Alabama (Software File, February 16) and was first released last August. The company has just completed an agreement assigning all rights to Gulf Computing Systems, in Kuwait, and Data Systems Inc, in Denver, Colorado.

A spokesman for DSI said that his firm had taken over support of GCE's existing customers in the US, numbering around 15, and was in the process of launching a US marketing campaign. Future development of the system would be conducted jointly by DSI and Gulf Computing.

Current users were predominantly commercial, he noted, but the educational sector had shown considerable interest and already had at least one user.

Basic/1, which includes its own operating system, is an extended version of the language, said to be roughly comparable with that provided by IBM on 5100 systems. A shareable interpreter, it can support up to twelve concurrent users on a 64K system.

The software is currently available in three versions: a single-user diskette version; a single-user version supporting both disc and diskette; and a multi-user version, also supporting both media.

In the US, these systems are priced at once-off charges of $1800, $2100, and $3800 respectively.

Significant enhancements announced by the new owners for release in September include an indexed sequential access method and a multi-field sort utility. The ISAM feature will allow multiple indexes, keyed or sequential access, and index reorganisation with or without record reorganisation.

Also under development is relocation translator support, which will permit the use of additional memory up to the Series 1 maximum of 256K. This will enable the software to provide effective support for a much larger number of simultaneous users, the DSI spokesman noted.

Unrelated to Gulf Oil, Gulf Computing Systems can be contacted at PO Box 25125, Safat, Kuwait, Arabian Gulf.

RPG II for DS 990s from Texas

AN RPG II compiler has been released by Texas Instruments for its new DS 990 family of commercial systems, based on the TI 990/10 processor (CW, May 4).

The software is sold to be closely compatible with IBM System 3 RPG II and includes a utility for transferring RPG II source programs and files from System 3 and System 32 diskettes to DS 990 disc files.

The TI package also offers a number of program development aids. Chief amongst these are a screen-oriented text editor, for program source manipulation, and a run-time trace option.

Prosper update from Dataskil

THE latest release of ICL Dataskil's modelling system Prosper contains new facilities as well as extending support to online users on ICL 1900, 3903/2904, and 2900 DME machines.

Prosper+ in particular concentrates on the requirements of financial planners, with tools in the areas of budgeting, forecasting, and costing. VDU+ provides development aids for the online user, designed to speed the construction of models.

Chinks in ICL's TP deal found for Cortez

THE marketing agreement between ICL and Telecomputing, which gave the former worldwide rights to TPS (Software File, October 6, 1977), has not excluded from the market other software houses with TP monitors for 2903/2904 systems.

The latest evidence comes from Zeus-Hermes, which has signed a contract with ICL (New Zealand) to cover marketing of Cortez-Plus and Cediz in New Zealand and Fiji. Effective from March 1, the agreement has already resulted in the sale of Cortez-Plus to an ICL customer in Auckland.

Mick Punter, managing director of Zeus-Hermes, said that despite the agreement with Telecomputing, TPS by no means appeared to have been adopted as an exclusive standard.

"We still prepare joint proposals with ICL and ICL salesmen, both in Europe and the UK, are continuing to offer Cortez. With the exception of Australia, where ICL could not take Cortez officially, we have not suffered at all from the company's agreement to market TPS."

Cortez, which also runs on 1900 and 2900 DME machines, originated from a software house in Australia (CW, December 11, 1975) but has been significantly enhanced by Zeus-Hermes, notably with the introduction of multi-threading (CW, September 22, 1977).

Cediz, an entry-level TP package for 2903/2904 users, was introduced by the company earlier this year (Software File, February 23) as a low-cost alternative for those going online for the first time.

Routing, scheduling system

A VEHICLE routing and scheduling package said to overcome the limitations on daily trip planning usually imposed by other similar systems has been developed by Deltran Analysis, of Cheadle Hulme, Cheshire. Called Trucka, it has been installed by CDC Data Services.

Features of the package include the ability to model road type and congestion, to limit specific goods to set vehicle types, and to prohibit the allocation of incompatible loads. The system can also handle priority goods, limited access locations, and variable time and distance constraints.

Designed to enable cost minimisation according to user-supplied parameters, the software at the moment caters for urban and interurban networks in the UK and Eire, but is currently being extended.

Time-saving in Panvalet update

THE latest release of Panvalet, Pansophic's source program management system for IBM 360/370 users, includes a number of new time-saving and security features. Version 10 also extends support to 3350 DASD units, to both DOS and OS versions of the software.

Heading the list of enhancements is the "I" command, which enables sections of code to be interchanged between Panvalet library members. The programmer can thus move routines without having to punch them out.

Also designed to save the operators' time is a new facility for selective backup or transfer of members. Using this facility, a protection file of specific members can be constructed without having to keypunch each required member name.

For TSO and CMS users, enhancements include a new command to display all or part of a member without having to first retrieve the member to a sequential data set. Batch and TSO sites also benefit from an optional security mechanism which prevents the renaming of production data sets.

Other enhancements in Version 10 include the option for automatic RPG, Autocoder, and JCL level stamping and a new column 72 code giving the ability to override default options for the ++WRITE, ++FORMAT, and ++OPTION commands.

SICOB PARIS

281,687 visitors from 112 countries studied
the office materials and data processing equipment
presented by 1,755 firms of 31 countries at Sicob 1977.

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You will go to the 29th
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French Chamber of Commerce House
54 Conduit Street
LONDON W1R 9SD
Tel: 439-3964/5/6

PUBLICIS R 603

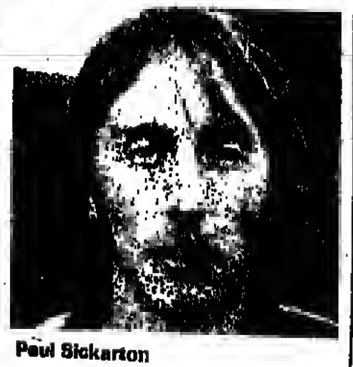
The winning men's team from the Midland Bank. (Left to right, back row) Rob Adams, Dave Wareham, Graham O'Neill. (Front row) Ian Balshaw, Gary Milligan, Paul Ashworth.

Manweb, the top ladies' team: (left to right) Vivien Elline, Cheryl Hunt, Jane Perry, Liz Jones.

COMPUTASTARS

Jenny Baines

Jane Perry



Paul Bickerton

Rain didn't stop play

DESPITE a cold and rainy day there was plenty of enthusiasm at the North West Heat of the Computastars competition, held at the Kirkby Sports Centre, Liverpool. The unseasonable weather cut the entry so that it was the smallest so far in the series with 11 men's teams and four women's teams taking part. Winner of the men's individual title was Paul Bickerton of the Inland Revenue, while the women's title was shared by Jane Perry of Manchester and North Western Electricity Board, Manweb, and Jenny Baines of Littlewoods.

Peter Smith, of Quadrant Software (left), prepares to put the shot which won him second place in the men's event, and (below) Cherril Garner of Littlewoods winning the ladies' shot put.

Competition for the men's team title was close with Midland Bank scoring 115½ points to win from Manweb with 109½. Third was Inland Revenue with 106. Top women's team was Manweb, with Littlewoods second and Inland Revenue third.

The final heat in the competition, that for the Midlands, takes place next Sunday, July 9, in Birmingham at the Alexander Stadium, Perry Bar. The events are due to start at noon.

The grand Computastars finals will be at the Crystal Palace sports complex, south London, on Saturday, September 30. This will be the biggest sports event ever organised for computer people and preparations are in hand to make it a great day out. Watch Computer Weekly for details.

The Computastars competition has been organised by John Goldsmith Computer Services with the support of Computer Weekly. Anyone who would like to assist at the Birmingham heat or at the finals should contact Gordon Cairns on 01-828 5356.

PEOPLE

Multiple appointments made at Compeda

TEN appointments have been announced by NRDC subsidiary Compeda, which markets high technology software systems for engineering and CAD applications.

Technical manager responsible for industrial and mechanical engineering is John Smith, formerly with the multinational SKF Engineering in the Netherlands, as senior engineer for manufacturing processes.

Mike Bean, previously chief industrial engineer with Taylor Instruments, joins John Smith's team as a salesman, and **John Prest** becomes a salesman for the Plant Design Management System, PDMS. Until recently he was commercial/sales manager with Warren Point.

Formerly a project engineer with AERE, Harwell, where he was responsible for introducing and implementing PDMS, **Chris Chaney** joins Compeda as a development engineer on the system.

Project manager of Compeda's Gaelic design system is **Michael Watts**, who as director of synergy logistics of Synergy Dynamics was in charge of software maintenance, development and testing. **John Cookson**, previously a marketing executive with Ferranti Cetec Graphics, has become senior technical sales consultant for Gaelic.

Recently appointed systems programmers are: **Ken Loosemore**, who as a research associate at Edinburgh University worked with Gaelic and designed one of Britain's first computer-controlled digital music synthesisers; **Alex Tweedly**, from Marconi Space and Defence Systems where he was a system and user support programmer; and **Andy Turner**, previously a senior analyst/programmer with the Institution of Electrical Engineers.

After four years as principal author with Plessey Radar, **Nair Vasudevan** joins Compeda as principal technical writer.

Jim Coe has joined AMI Microsystems as manager of the memory product marketing department, from Intel, where he was manager of international microcomputer marketing.

Arnold Cander has joined Logabax as a systems analyst after holding similar positions with PDM Computer Services and Adler.

David Dove has become managing director of Atlantic Leasing Ltd. Formerly he was UK country manager for Itel UK.

Alan Bates, formerly deputy group managing director of Hoskyns Group, has become operations director of Audits of Great Britain Ltd.

Peter Bell has left ICL, where he was regional manager, field engineering, for Central London, to join Systime as UK field operations manager.

David Jordine has joined CMC as a senior systems analyst from Lucas Aerospace where he was a systems section leader. **Barbara Butler** also joins CMC as a senior systems analyst; most recently she held the same job with Rank Xerox.

David O'Toole, a founder member and recently regional director of CMC, has joined DCC International as marketing director.

Peter Turner, formerly an IDMS database consultant with ICL, has been appointed systems consultant with the software services division of Safe Computing.

Keith Oliver becomes a vice-president of Booz Allen and Hamilton, based in the London office. Previously he was a consultant with Business Operations Research.

Redifon opens Hull office

A SALES office recently opened by Redifon Computers to serve Yorkshire and Humberside will be managed by territory manager Gary O'Nions. The address is Wassand Street, Hull, North Humberside HU3 4AL, and the telephone number (0482) 26714.

New appointments at Redifon are those of Les Fettel, formerly a senior sales executive with Honeywell, as senior territory manager for central accounts South, and Steve Gill as London branch manager, previously district manager (manufacturing) with ICL.

Soccer

Summer Computer League

IN Division IV, the team from Stalfscana has changed its name to Targa and will be referred to as such from now on.

Results

Division I

Datascene 4, Rank Xerox 4

Division II

ICL 2, John Lewis 2

Datasolve (City) 4, Lambeth 3

Division III

Datasolve (WE) 2, Victoria 1

Victoria 3, 3M 3

Division IV

Wallorax 3, Computer Weekly 5

Sunzi DS 5, Targa 4

Division V

Sherwood 5, Allen 1

CDC 6, Jadpu B 1

Northern 5-a-side

Quadrant beat ICI(CMS) 5-2 in a replay of the final of the Northern five-a-side tournament played at the Knutsford Sports Centre.

JULY 10-14

Current problems and methods in partial differential equations (Fourth Summer School). Liverpool and Manchester Universities. Department of Mathematics, University of Manchester.

JULY 12

Meeting. CMC Users' Association (CUMAC). Norfolk County Council, Norwich. 10.30. Details: Maidenhead 29525.

JULY 13

Meeting. BCS Software Engineering Group. Birkbeck College, London WC2.

JULY 18-20

Artificial intelligence conference AISB/GI, Hamburg. Details Derek Sleeman, Leeds 31751, ext 7284.

JULY 19-20

Local authorities group meeting IBM Computer Users' Association INLOGOV. Birmingham University.

JULY 20

Southern Group meeting. ICL Data Entry Users' Group. HSV Ltd, Basingstoke. 11.00.

AUGUST 6-8

Computers, communications and technology transfer. Jerusalem conference on Information Technology. Information Processing Association of Israel/IEEE. Jerusalem.

AUGUST 21-24

Operational data security workshop. Operational Data Security Corp. City University, London EC1. Register August 16. 01-253 4399, ext 347.

AUGUST 21-25

Cybernetics and systems fourth international congress. World Organisation of General Systems and Cybernetics. Amsterdam. Details: Dr J Rose, College of Technology, Blackburn. Tel 0254 64321.

AUGUST 22-25

Conference on parallel processing. IEEE Computer Society/Wayne State University. Bellaire, Michigan. USA.

AUGUST 23-25

Siggraph 78, fifth conference on computer graphics and interactive techniques. Association for Computing Machinery. Atlanta, Georgia. USA.

AUGUST 28-SEPTEMBER 1

Eighth Australian Computer Conference. Australian Computer Society. Canberra.

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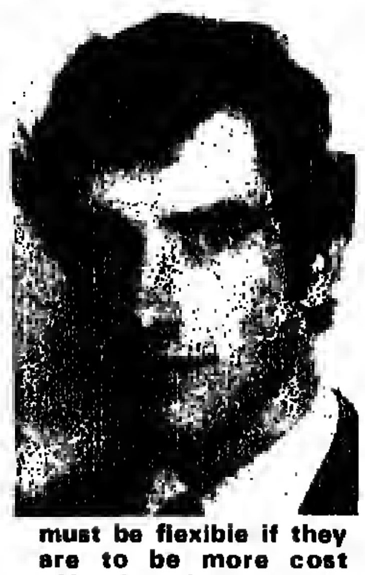
COMPUTERS AND THE ACCOUNTANT

Bored invoice clerks 'soon thing of past'

By Paul Rayner



Due to the success of early accounting systems, accountants have realised that computers can give management information that could only be obtained previously at great cost and effort.

However, while the earlier implementations were few and well defined, many of the present ones require the skill and ingenuity of systems designers to be further extended both in-house and by the software houses.

In the first article in this feature Paul Rayner, European Marketing Manager of Northern Software Consultants, urges that new systems must be flexible if they are to be more cost effective than manual ones.

IT has been said that the purpose of any business is the production of invoices; for businesses only make or supply things in order to get paid; and few customers will pay without first receiving a clear and comprehensive invoice.

A speedy and accurate invoicing system is, therefore, essential to the success of any business. Speed is important in avoiding cash-flow problems. For the sooner the invoice is issued, the sooner the customer will pay.

Accuracy is necessary in order to prevent disagreements and disputes which may delay payment and lose customer goodwill.

Producing invoices manually or by accounting machine is an exacting and tedious task. Product prices must be looked up, discount structures checked, extensions verified, VAT and sundry charges calculated and the totals posted to the sales ledger. This must done to a very tight timetable.

At first sight the invoicing department is a prime candidate for computerisation. Yet many companies have repeatedly decided against this.

With all its failings, a manual system is flexible and in today's highly competitive market place the ability to change pricing policies and discount structures is essential to success.

It is this need for flexibility that has, until now, prevented many companies from fully automating their invoicing department. Even a simple invoicing system requires a big investment in programmer time and once the programs are written it requires a further investment to change them.

The marketing department of the company is thus "locked-in" to a set of pricing policies and discount structures that may no longer be suitable.

Careful design and clever programming can make the programs flexible enough to meet the likely fluctuations in marketing policy. However, many computer departments have neither the time nor the resources for such sophisticated work.

An obvious solution for the user who wants a first rate system, is to buy a ready-made and fully tested program package. A choice of packages is now available, with a wide range of prices and facilities. Some are merely in-house systems which the writers think are good enough to sell to others.

Some, however, have been written by reputable software houses with the specific aim of being flexible, general-purpose packages usable by a wide variety of companies.

There are certain basic requirements that any packaged invoicing system must fulfil, it should: 1. Produce invoices and credit notes; 2. Handle VAT and discounts; 3. Allow the processing of non-stock items and "one-off" customers; 4. Print a register of all invoices and credit notes produced: and 5. Print out control information so that auditors and others can verify that everything has worked correctly.

In addition the invoicing system will need to pass details of all invoices and credit notes over to the sales ledger. This "passing across" should be automatic. Ideally the customer information common to both systems should be held on one set of files.

A complete interface of this sort saves manual work, ensures that the two systems always balance and avoids inconsistencies with customer names and addresses.

The invoicing system should also interface with the stock system. This is essential to access product descriptions, prices, units of issue, etc. Again information common to both systems should be held on one set of files. Obviously it would be foolish to have two product master files — one for invoicing and one for the stock system.

Finally, the system should ease the task of both the financial and management accountants by producing VAT reports and sales analyses. This information should all be available within the system and it should be made available in suitably laid out form to all those who need to use it.

The simplified diagram on the left shows the system flow of a typical package, namely the NOR-INV package developed by Northern Software Consultants;

1. Details of despatches and returns from customers are entered as input. This can be either from manually prepared input or can be computer records transferred from a sales order processing system;

2. The manually prepared input is checked for validity. This involves looking up product and customer codes on the product and customer master files. The system also allows input relating to non-stock items and non-standard customers;

3. Details of stock-items are picked up from the product master file. Information picked up includes descriptions, prices, discount and VAT codes;

4. Names, addresses and discount codes for standard customers are then picked up from the customer master file;

5. With all the necessary information now available, the user's invoices and credit notes can be printed together with an invoice credit note register: and

6. The analysis routines allow the user to get management reports such as sales analyses and audit reports.

The real problem with invoicing comes with the actual invoice document itself. Whilst certain information must, by law, appear there is no such thing as a "standard" invoice. Instead every business has a different layout.

On the whole, these differences reflect the diverse characteristics of the organisations issuing them. For example, an invoice from a flour miller will have to contain information different from that contained on an invoice sent by a garage.

An even more varied item on invoices is the pricing and discounting structures to be used. For example, there are many different types of discount: product discount, eg 10% discount in this item; customer discount, eg 15% discount for favoured customers; quantity discount, eg 10% lower unit price when more than 50 delivered; invoice value discount, eg 5% discount on all invoices worth more than £100.00; settlement discount, eg 3% of total to be paid, if payment is received within seven days: and, special discount, eg a special reduction below list price negotiated by the salesman so as to get the order in the first place.

In a business any or all of these discounts may be used in a complex inter-relating structure. For example, certain customers may get discounts on some product lines, but not on others.

The actual structure used usually reflects the trade-custom of the industry, combined with the company's current marketing policy.

Like anything in the commercial world, marketing policies change. As they change so do the price and discount structure. For example, a new type of discount may be necessary in order to secure a big new contract.

For a computer bureau, or the computer centre of a group of companies, the problem is even greater, for each user will probably require something different.

This results in a great expenditure of time and effort in modifying programs for each user, and then maintaining the many different versions of the programs that result.

The only real solution is to have a system that allows each user to specify the layout, con-

● Turn to page 13

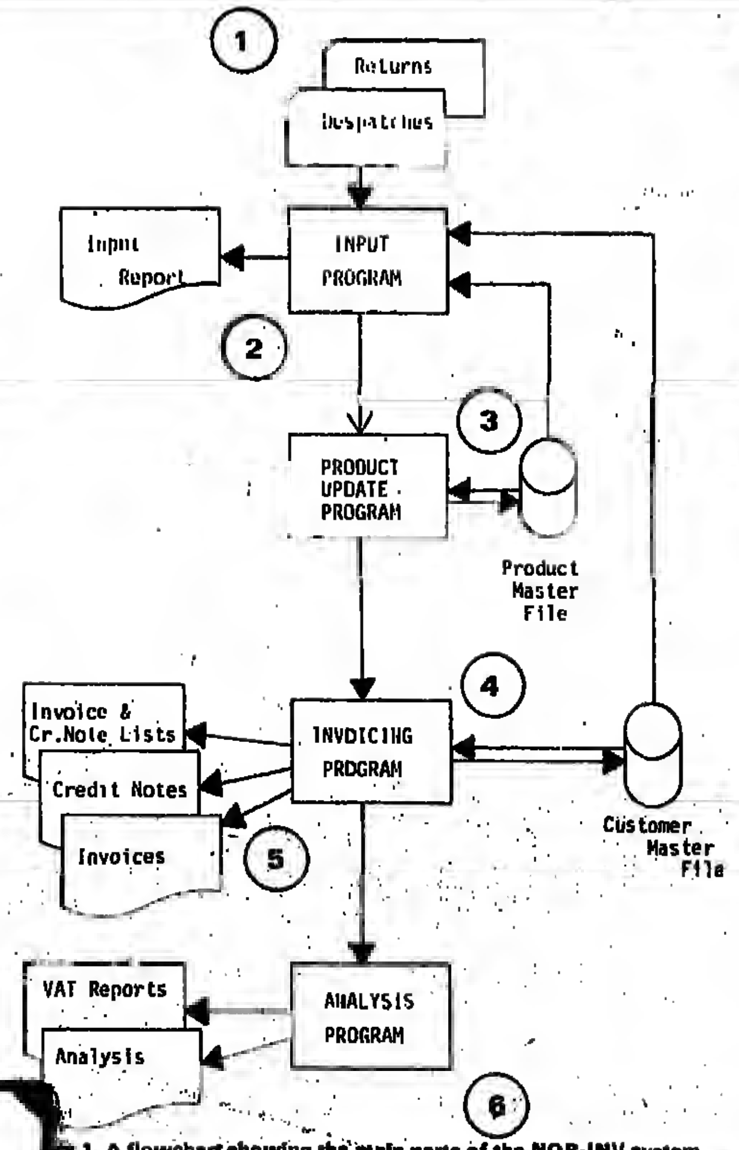
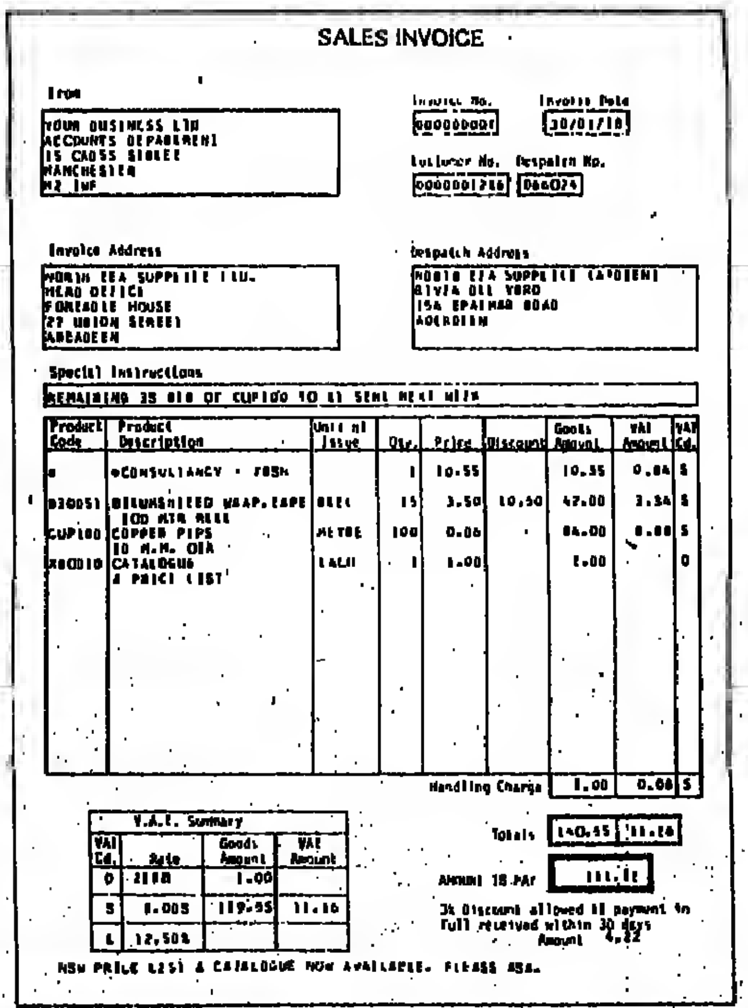


Figure 1. A flowchart showing the main parts of the NOR-INV system



SALES INVOICE

From

YOUR BUSINESS LTD
ACCOUNTS DEPARTMENT
15 CROSS STREET
MANCHESTER
M2 1NF

Invoice No. 000000001

Invoice Date 30/01/78

Customer No. 0000001286

Despatch No. 066024

Invoice Address

NORTH SEA SUPPLIES LTD.
HEAD OFFICE
FORESIDE HOUSE
27 UNION STREET
ABERDEEN

Despatch Address

NORTH SEA SUPPLIES (ABERDEEN)
RIVER DEE YARD
15A [illegible] ROAD
ABERDEEN

Special Instructions

REMAINING 35 [illegible] OF CUP100 TO BE SENT NEXT WEEK

Product Code	Product Description	Unit of Issue	Qty.	Price	Discount	Goods Amount	VAT Amount	VAT Cd.
*	*CONSULTANCY - [illegible]		1	10.55		10.55	0.84	S
B30051	BITUMENISED WRAP. TAPE 100 MTR REEL	REEL	15	3.50	10.50	42.00	3.36	S
CUP100	COPPER PIPE 10 M.M. DIA	METRE	100	0.64		64.00	[illegible]	S
XECD10	CATALOGUE & PRICE LIST	EACH	1	1.00		1.00		0

Handling Charge 1.00 0.08 S

V.A.T. Summary			
VAT Cd.	Rate	Goods Amount	VAT Amount
0	ZERO	1.00	
S	8.00%	119.55	11.16
L	12.50%		

Totals 140.55 11.16

AMOUNT TO PAY [illegible]

3% Discount allowed if payment in full received within 30 days Amount 4.22

NEW PRICE LIST & CATALOGUE NOW AVAILABLE. PLEASE ASK.

Figure 2. A typical invoice produced by the NOR-INV system.

Extra pressure on the disabled

IN THE BCS Specialist Group for the Disabled, of which I am the new secretary, there has been a lot of talk of training the disabled for work as programmers and of producing electronic aids to help the disabled find work in the computer industry.

While this is laudable for those who are actively seeking work, I feel that it puts extra pressure on the disabled.

Much has been made of the effects of microprocessors in taking over a great deal of the workload leaving more time for leisure activities. This calls for a different attitude to work. At present society judges a man by his work and people vie with each other to explain how long and hard they work.

With modern aids in communication, word processing, computing, etc, a whole new world is opening up to even the most severely disabled. With these aids they will be able to become writers, artists, researchers, etc. How much better, when asked the question "What do you do?," instead of saying, "I am disabled," I could answer I am writing a novel, or am studying the flora of the Seychelles.

If the disabled, an "enforced leisure class," can make use of new technology to become useful citizens they may be able to point to the way the rest of society will have to learn to live — and enjoy its leisure — when all the jobs we now consider most important have been taken over by computer-based systems.

R. A. POTTER
Secretary
BCS Specialist Group for the Disabled.

Too late for Britannia

I NOTE that you have given a brief report on the introduction of the Britannia Building Society's terminal system, Midas (CW, June 22). The information in the story was issued by us in a press release towards the end of last year and is some six months out of date. Perhaps your journalists would better be employed writing history books.

The story mentions that completion of the first phase of the system was expected in June this year and, in fact, the terminals have been installed in 49 branches on schedule.

D. MAWDSLEY
Data Processing Manager
Britannia Building Society
Leek, Staffs.

Congratulations to the Britannia for getting its system up and running on time. We dealt with the story when the information was first issued but it missed the boat that time round and was regurgitated by the system a couple of weeks ago. The repetition slipped past our sharp editorial eyes on this occasion and we hang our heads in shame. Nevertheless we are sure that our readers would want to know of the progress that has been made by building societies in this area. It is still a pioneering venture by the Britannia although various banking institutions have, of course, had similar terminal systems running for some time. – EDITOR.

The Editor welcomes letters on subjects published in Computer Weekly, or on original topics. All letters must be accompanied by the writer's name and address, not necessarily for publication. All letters are liable to be cut at the discretion of the Editor, unless correspondents state that their letters may not be cut.

LETTERS

To: The Editor, Computer Weekly,
Dorset House, Stamford Street, London SE1 9LU

More questions for the Tories

FOLLOWING the Computer Weekly Interview with Sir Keith Joseph, who coordinates the Tory Party think tank, the Centre for Policy Studies (CW, April 27), a reader, J. Blair, wrote to the Editor suggesting further questions that could be posed. The questions were forwarded to Sir Keith and he has now replied. Here we publish Mr Blair's questions and Sir Keith's answers . . . . .

Question 1: If State intervention is always so disastrous, would Sir Keith still oppose the Ferranti rescue? This firm has been transformed from a "lame duck" into a record profit maker. Had Industry Secretary Tony Benn not injected £15 million into Ferranti, after NatWest's refusal to extend the overdraft, would we have seen more competition or more monopoly? We all know that the plum Ferranti divisions would have been parcelled up between GEC and Plessey.

Question 2: The same as Question 1, replacing Ferranti with the names of the leading UK software houses.

Question 3: Sir Keith has a touching belief that "the consumer controls industry." Has he ever bought anything from IBM?

Question 4: The same as Question 3, replacing IBM with ICL.

Question 5: If the Post Office is the technological dinosaur of Sir Keith's nightmares, how come it has beaten the world with viewdata/Prestel?

Question 6: If public spending curbs, plus dramatic tax cuts, are the key to freedom and prosperity, why did the best example of this treatment—Chile—lead to complete economic collapse?

Sir Keith replies

SIR Keith replied as follows:

Your Questions 1 and 2 suggest that if Ferranti or the leading UK software houses had not been taken on board by the NEB, they would have been "parcelled up" by a handful of big companies. There are several points to make in reply.

First, because companies are big it does not follow that they do not compete. If they act in collusion, then there are powers for governments to investigate and to stop.

Secondly, the shortage of vigorous and expanding companies in many fields flows from the incomprehension and the hostility in relation to enterprise manifested to some extent by several post-war governments and, in particular, by the present government. If income and capital taxation were less heavy and if government spending and regulations, coupled with controls on pay, prices and dividends, did not so stifle the private sector, we would have a far more numerous and active crop of companies.

As you probably know, the death-rate of small businesses has rocketed and the birth-rate of small businesses has plummeted these last years.

Your third and fourth questions imply a seller's market in connection with both IBM and ICL. I recognise the dominating position built up by IBM. But I do not fancy that this would be shattered by anything likely to be achieved by the NEB. Moreover, it is not valid to imply that customers have nowhere to go but IBM or ICL.

Many other firms compete with them.

Your Question 5 suggests that the Post Office development of viewdata and Prestel acquits the Post Office of being technologically inadequate. I still say that the Post Office has been a bad client to the private sector in the sense that it has not encouraged designs and services with a wide enough world market to ensure longer runs and, therefore, lower costs, than its own orders can justify.

The Post Office has the monopoly. From the finance that reaches it, due to that monopoly, it sets aside substantial money for research. It would be extraordinary if the research produced no good results.

On all the issues of Post Office adequacy, I ask you to read the Carter Report, which is the source of much of my information.

Finally, you suggest that Chile is an argument against my view that there should be a shift of resources from the public to the private sector. I am no great expert on Chile but I wonder whether you are more of an expert than I?

As I understand the position, the Allende government left Chile in the grip of a horrendous inflationary momentum, which the present government has managed to bring down in a few years to figures that, though still very bad indeed, are of a quite different magnitude from those that they inherited. My recollection is that the inherited rate was over 1,000% a year and the current rate is between 20% and 30% a year.

Solution is not unique

I FELT it incumbent upon myself to inform you that your solution for the cryptogram:

BOY
GIRL
LOVE
———
ELOPE

is not unique. Another possible solution is:

653
9427
7501
———
17581

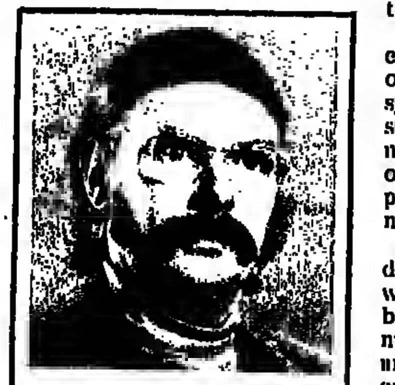
As you will see, both 653 and 9427 are prime numbers.

Culham Laboratory,
Oxfordshire.

A. G. HILLARY

ONE of the few certainties in the computer industry, over the next decade, is that preservation of users' investment in software will assume a steadily growing importance. So it is safe to assume that one of IBM's lesser known operating systems, and one which offers a solution to the problem of operating software compatibility, will emerge from the shadows and gain an increasing number of devotees in the months and years to come.

Taking a second look at the Virtual Machine



By TIM PALMER

THE Virtual Machine, VM/370, operating system, from IBM, has come in for an unaccustomed glare of publicity over the past few months as a result of widespread suggestions that it is likely to be featured strongly in the announcement of the forthcoming E-series which is to replace the low end of System 370. Whether or not the forecasters have got it right, VM offers a unique range of capabilities to IBM 370 and 3030 series users and is well worth a second look.

VM/370 was born out of a project at IBM's Scientific Centre at Cambridge, Massachusetts. In 1964, the centre began working on a project which was intended to make computers more accessible to the user. The first step was to develop hardware and control software, producing an experimental machine which added virtual addressing to the then new 360/40.

In 1967, the only IBM 360 machine with virtual storage, the 360/67 was announced, together with the Control Program 67 operating system and CMS time sharing software.

CP-67 was the direct forerunner to VM/370, and CMS at that time stood for Cambridge Monitor System. The name, though not the abbreviation, was later changed, and CMS now signifies Conversational Monitor System.

The development work continued within IBM and CP-67 evolved into CP-370; this ran on a 360/67, and made it possible to emulate the virtual storage 370 environment before the hardware was available.

In 1972, the first virtual storage 370s were announced, together with four new operating systems. DOS/VS replaced DOS; OS/VS1 replaced MFT and OS/VS2 replaced MVT. The fourth operating system was VM/CMS, which initially simply enabled several users of a 370 running under VM to set up their own CMS "virtual machines."

The key feature of VM/CMS was this facility which allowed virtual machines to be set up within the system. Although CMS provided something new, and was therefore initially stressed, it was equally possible to set up virtual machines for most other IBM operating systems to run under VM.

It offered a time sharing facility for medium scale users, enabling them to do program development on their machine using CMS while simultaneously running at least a part of their standard workload under their mainstream operating system. However, market response was uneven, and reports soon filtered back that while MFT ran quite efficiently under VM, OS/VS1 and DOS/VS imposed overheads which for many users were unacceptable.

This was hardly surprising, since even without CMS, VM duplicates many of the features of any mainframe operating system, but it limited usage of VM.

In 1974, IBM offered a VM assist feature for the 370/135, 145 and 158, which went some way to improving VM performance by putting parts of it into microcode. It was only available as a "special", RPQ or Request Price Quotation in IBM parlance, on the 168, because the latter is not a microcoded machine.

In 1975, the shortcomings of OS/VS1 under VM were alleviated by modifications to Release 4 of VS1, which made it possible to use the VM page supervisor, thereby eliminating one area of inefficient duplication.

The following year, assist features for DOS/VS were announced, and in mid-1978, the 370/138 and 148 appeared, which offered an extended VM assist as an option. Called VM Extended Control Program Support, this firmware offered very significant improvements in VM performance.

Unlike most of the earlier offerings, it improved the running of VM across the board, regardless of which operating system was being used under VM, and also enhanced CMS operation.

The approach to producing this enhancement to performance was to run hardware and software monitors, in order to determine which parts of the operating system would offer significant performance improvements if they were reimplemented in microcode. The result using VM-ECPS is claimed to be an improvement of up to five times and a reduction of up to 50% in total VM supervisor time.

Any operating system designed to run on an IBM 370 can be run under VM; there is no restriction to a specific range of proprietary IBM operating systems.

Although CMS is designed primarily for online interaction, there is a CMS batch facility, and it is possible, and indeed is done, to run VM and CMS without any other operating system. However, it is not possible to run CMS without VM.

Within IBM there are large CMS-only systems used for such applications as engineering modelling. At the Watson Research Labs there are three 168s, two of them running VM/CMS only and supporting several hundred terminals, while the third runs MVS with Time Sharing Option.

Where a number of CMS virtual machines are supported, together with a workload running under some other operating system, each terminal is allocated a short time-slice at high priority, while the compute-bound jobs get longer time segments at lower priority. The operator can anyway control the priority given to different parts of the system.

Since VM/CMS is an operating system in its own right, it comes with a number of language compilers. The PL/I optimising and checkout compilers are the same as those under OS; the same three Fortran compilers as are available with OS are supported by CMS, but have additional interactive debug facilities. The Cobol compiler with interactive debug is the same as that under OS.

There is also an assembler, a VS Basic with interactive debug, and a VS APL, and other 360 compilers and packages have been adapted by users to run under VM/CMS.

Access methods supported by VM/CMS are Virtual Storage, VSAM; Sequential, SAM; Basic Direct, BDAM; and Basic Partitioned, BPAM.

As CMS was designed to be easy to use, there are a number of attractive features, notably a synonym facility which allows standard functions in the command language to be renamed, an aid much appreciated by people who do not understand much English.

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By JOHN FINNIE

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Back in those days, DP was so young that DP people could not recognise a recurring cliche when they saw it. During the 1980s, as each successive wave of mini-minis, and micro-minis, and stand-alone micros hit the market, the claims came up time after time that the last model must go the way of the dinosaurs etc, and that the latest model must, in the interest of user identity etc, be run right down there at the user's desk, without any meddling from above.

In those companies, which could afford the cost and tolerate the traumas of following the decentralisation dogma, the effects became progressively more unsettling. Then as now, the statement of the projected benefits from computer development was an exercise in creative fiction, and the 1980s saw the appearance of the Freudian Computer Decentralisation consultant who tried to resolve the Oedipal conflict between, say, the Father figure of the Production Planning Section who wanted to keep its big machine and the Father rejecting figure of the Tools Requisitioner who, in the interests of user identity etc, wanted his freedom.

Senior management were half hearted in tackling this conflict, since they themselves were facing up to the word processing dilemma. By 1983, it was possible for the manager's written text to be captured by OCR — without benefit of secretary — provided the manager had gone through a two-week course flatteringly entitled "character formation." By 1987, it was possible for the spoken word to be captured and converted into printed text, provided the manager had gone through a three-week course in elocution. Both courses were massively undersubscribed. An influential study by Kowalski, the US behavioural scientists on "The Influence on Management Creativity of the Female Secretary as a Fantasy Object," gave intellectual respectability to this covert opposition.

The impact on the man/job interface was controllable. The impact on employment was not. If we look back to the mid-1970s, we can see three main schools of thought on the question of employment — the Doomsday School which demanded government intervention to stop the world being turned upside down; the Boy Frankenstein School which held that the technologist could not reasonably be expected to put right society's problems, but that if society could only show the same inventive genius as the technologist, then what a world it would be; and the Free Market Forces School which reckoned that all that the world was facing was a redistribution of employment.

With the benefit of hindsight 25 years on, we can see that the Doomsday School were broadly right in predicting the worst, but that they were touchingly optimistic in hoping that governments could break away from democratic inertia. It took, after all, the Ethiopian seizure of the Saudi oil fields before the US government pushed up its gasoline tax to a discriminatory level.

On the other hand, and again with the benefit of hindsight, it was unrealistic to suppose, as the Free Market Forcers did, that each production line job displaced by a robot would be balanced out by a production line job making robots, or that if that job should vanish a job selling robots would emerge to preserve the equilibrium.

Only in the computer industry itself was anything approaching equilibrium achieved. But that equilibrium involved a massive reduction in the manufacturing workforce to the extent that world production depended upon a handful of ladies with keen eyesight and soldering irons in Bataam (a lower labour cost location for the Taiwanese companies); a massive reduction in account executives, regional managers, industrial sector coordinators and others with a fine nose for the wine list; counter balanced by a huge increase in merchandisers who laboured away in company tee shirts restocking the shelves in the computer discount houses. In most other industries there was still the belief that in the long run the equilibrium might yet come right, but most had the sinking feeling that in the long run, as the early 20th century economist Maynard Keynes had pointed out, we are all dead.

UK government policy towards unemployment can be classified under three broad phases. Between 1978 and 1988, the policy — never formally stated—was to give State support to those industries which were under structural threat from the micro revolution. The support was indiscriminate, and was so costly that this policy is considered to have been instrumental in bringing down the Hattersley government in 1989. The incoming Social Democrat coalition ended that support, and after tacitly recognising the impossibility of creating the new jobs promised in the election manifesto, launched a massive campaign to change public attitudes towards unemployment.

The aims of the campaign were well meant, but it achieved a certain notoriety, in part through its use of the "Lie back and enjoy it" slogan, and in part through employment as Government Leisure Advisers of retired hippies from the early 1970s. The campaign must be adjudged an honourable failure. Not even the legalisation of cannabis in 1991 could shake the influence of the Work Ethic. Hundreds of years of conditioning had convinced the Western world that it was better to work than not to work, since not only would Satan surely find some mischief for idle hands to do, but in the early 90s there was still a marginal financial advantage in favour of working.

In the face of that failure, the government set up in 1995 three new institutions — the Department of Leisure Technology, which gives financial support for the development of devices — such as electronic Patience — which makes idleness more tolerable; the Department of Employment Preservation, which sets the financial levy to be paid by companies, manufacturing or installing labour saving equipment; and the Department of Employment Creation, which compensates companies for every labour saving machine taken out of use.

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The most authoritative predictions suggest that society should have successfully adapted to the technical revolution within the next 10 years. Perhaps 20 years, but definitely not more than 50.

Extra pressure on the disabled

IN THE BCS Specialist Group for the Disabled, of which I am the new secretary, there has been a lot of talk of training the disabled for work as programmers and of producing electronic aids to help the disabled find work in the computer industry.

While this is laudable for those who are actively seeking work, I feel that it puts extra pressure on the disabled.

Much has been made of the effects of microprocessors in taking over a great deal of the workload leaving more time for leisure activities. This calls for a different attitude to work. At present society judges a man by his work and people vie with each other to explain how long and hard they work.

With modern aids in communication, word processing, computing, etc, a whole new world is opening up to even the most severely disabled. With these aids they will be able to become writers, artists, researchers, etc. How much better, when asked the question "What do you do?," instead of saying, "I am disabled," I could answer I am writing a novel, or am studying the flora of the Seychelles.

If the disabled, an "enforced leisure class," can make use of new technology to become useful citizens they may be able to point to the way the rest of society will have to learn to live — and enjoy its leisure — when all the jobs we now consider most important have been taken over by computer-board systems.

R. A. POTTER
Secretary
BCS Specialist Group for the Disabled.

Too late for Britannia

I NOTE that you have given a brief report on the introduction of the Britannia Building Society's terminal system, Midas (CW, June 22). The information in the story was issued by us in a Press release towards the end of last year and is some six months out of date. Perhaps your journalists would better be employed writing history books.

The story mentions that completion of the first phase of the system was expected in June this year and, in fact, the terminals have been installed in 49 branches on schedule.

D. MAWDSLEY
Data Processing Manager
Britannia Building Society
Leek, Staffs.

Congratulations to the Britannia for getting its system up and running on time. We dealt with the story when the information was first issued but it missed the boat that time round and was regurgitated by the system a couple of weeks ago. The repetition slipped past our sharp editorial eyes on this occasion and we hang our heads in shame. Nevertheless we are sure that our readers would want to know of the progress that has been made by building societies in this area. It is still a pioneering venture by the Britannia although various banking institutions have, of course, had similar terminal systems running for some time. — EDITOR.

The Editor welcomes letters on subjects published in Computer Weekly, or on original topics. All letters must be accompanied by the writer's name and address, not necessarily for publication. All letters are liable to be cut at the discretion of the Editor, unless correspondents state that their letters may not be cut.

LETTERS

To: The Editor, Computer Weekly,
Dorset House, Stamford Street, London SE1 9LU

More questions for the Tories

FOLLOWING the Computer Weekly interview with Sir Keith Joseph, who co-ordinates the Tory Party think tank, the Centre for Policy Studies (CW, April 27), a reader, J. Blair, wrote to the Editor suggesting further questions that could be posed. The questions were forwarded to Sir Keith and he has now replied. Here we publish Mr Blair's questions and Sir Keith's answers .....

Question 1: If State intervention is always so disastrous, would Sir Keith still oppose the Ferranti rescue? This firm has been transformed from a "lame duck" into a record profit maker. Had Industry Secretary Tony Benn not injected £15 million into Ferranti, after NatWest's refusal to extend the overdraft, would we have seen more competition or more monopoly? We all know that the plum Ferranti divisions would have been parcelled up between GEC and Plessey.

Question 2: The same as Question 1, replacing Ferranti with the names of the leading UK software houses.

Question 3: Sir Keith has a touching belief that "the consumer controls industry." Has he ever bought anything from IBM?

Question 4: The same as Question 3, replacing IBM with ICL.

Question 5: If the Post Office is the technological dinosaur of Sir Keith's nightmares, how come it has beaten the world with viewdata/Prestel?

Question 6: If public spending curbs, plus dramatic tax cuts, are the key to freedom and prosperity, why did the best example of this treatment — Chile — lead to complete economic collapse?

Sir Keith replies

SIR Keith replied as follows:

Your Questions 1 and 2 suggest that if Ferranti or the leading UK software houses had not been taken on board by the NEB, they would have been "parcelled up" by a handful of big companies. There are several points to make in reply.

First, because companies are big it does not follow that they do not compete. If they act in collusion, then there are powers for governments to investigate and to stop.

Secondly, the shortage of vigorous and expanding companies in many fields flows from the incomprehension and the hostility in relation to enterprise manifested to some extent by several post-war governments and, in particular, by the present government. If income and capital taxation were less heavy and if government spending and regulations, coupled with controls on pay, prices and dividends, did not so stifle the private sector, we would have a far more numerous and active crop of companies.

As you probably know, the death-rate of small businesses has rocketed and the birth-rate of small businesses has plummeted these last years.

Your third and fourth questions imply a seller's market in connection with both IBM and ICL. I recognise the dominating position built up by IBM. But I do not fancy that this would be shattered by anything likely to be achieved by the NEB. Moreover, it is not valid to imply that customers have nowhere to go but IBM or ICL.

Many other firms compete with them.

Your Question 5 suggests that the Post Office development of viewdata and Prestel acquits the Post Office of being technologically inadequate. I still say that the Post Office has been a bad client to the private sector in the sense that it has not encouraged designs and services with a wide enough world market to ensure longer runs and, therefore, lower costs, than its own orders can justify.

The Post Office has the monopoly. From the finance that reaches it, due to that monopoly, it sets aside substantial money for research. It would be extraordinary if the research produced no good results.

On all the issues of Post Office adequacy, I ask you to read the Carter Report, which is the source of much of my information.

Finally, you suggest that Chile is an argument against my view that there should be a shift of resources from the public to the private sector. I am no great expert on Chile but I wonder whether you are more of an expert than I?

As I understand the position, the Allende government left Chile in the grip of a horrendous inflationary momentum, which the present government has managed to bring down in a few years to figures that, though still very bad indeed, are of a quite different magnitude from those that they inherited. My recollection is that the inherited rate was over 1,000% a year and the current rate is between 20% and 30% a year.

Solution is not unique

I FELT it incumbent upon myself to inform you that your solution for the cryptogram:

```
 BOY
 GIRL
 LOVE
-----
ELOPE
```

is not unique. Another possible solution is:

```
  863
 9427
 7501
-----
17581
```

As you will see, both 863 and 9427 are prime numbers.

A. G. HILLARY
Culham Laboratory,
Oxfordshire.

ONE of the few certainties in the computer industry, over the next decade, is that preservation of users' investment in software will assume a steadily growing importance. So it is safe to assume that one of IBM's lesser known operating systems, and one which offers a solution to the problem of operating software compatibility, will emerge from the shadows and gain an increasing number of devotees in the months and years to come.

Taking a second look at the Virtual Machine

THE Virtual Machine, VM/370, operating system, from IBM, has come in for an unaccustomed glare of publicity over the past few months as a result of widespread suggestions that it is likely to be featured strongly in the announcement of the forthcoming E-series which is to replace the low end of System 370. Whether or not the forecasters have got it right, VM offers a unique range of capabilities to IBM 370 and 3030 series users and is well worth a second look.

VM/370 was born out of a project at IBM's Scientific Centre at Cambridge, Massachusetts. In 1964, the centre began working on a project which was intended to make computers more accessible to the user. The first step was to develop hardware and control software, producing an experimental machine which added virtual addressing to the then new 360/40.

In 1967, the only IBM 360 machine with virtual storage, the 360/67 was announced, together with the Control Program 67 operating system and CMS time sharing software.

CP-67 was the direct forerunner to VM/370, and CMS at that time stood for Cambridge Monitor System. The name, though not the abbreviation, was later changed, and CMS now signifies Conversational Monitor System.

The development work continued within IBM and CP-67 evolved into CP-370; this ran on a 360/67, and made it possible to emulate the virtual storage 370 environment before the hardware was available.

In 1972, the first virtual storage 370s were announced, together with four new operating systems. DOS/VS replaced DOS; OS/VS1 replaced MFT and OS/VS2 replaced MVT. The fourth operating system was VM/CMS, which initially simply enabled several users of a 370 running under VM to set up their own CMS "virtual machines."

The key feature of VM/CMS was this facility which allowed virtual machines to be set up within the system. Although CMS provided something new, and was therefore initially stressed, it was equally possible to set up virtual machines for most other IBM operating systems to run under VM.

It offered a time sharing facility for medium scale users, enabling them to do program development on their machine using CMS while simultaneously running at least a part of their standard workload under their mainstream operating system. However, market response was uneven, and reports soon filtered back that while MFT ran quite efficiently under VM, OS/VS1 and DOS/VS imposed overheads which for many users were unacceptable.

This was hardly surprising, since even without CMS, VM duplicates many of the features of any mainframe operating system, but it limited usage of VM.

In 1974, IBM offered a VM assist feature for the 370/135, 145 and 168, which went some way to improving VM performance by putting parts of it into microcode. It was only available as a "special", RPQ or Request Price Quotation in IBM parlance, on the 168, because the latter is not a microcoded machine.

In 1975, the shortcomings of OS/VS1 under VM were alleviated by modifications to Release 4 of VS1, which made it possible to use the VM page supervisor, thereby eliminating one area of inefficient duplication.

The following year, assist features for DOS/VS were announced, and in mid-1976, the 370/138 and 148 appeared, which offered an extended VM assist as an option. Called VM Extended Control Program Support, this firmware offered very significant improvements in VM performance.

Unlike most of the earlier offerings, it improved the running of VM across the board, regardless of which operating system was being used under VM, and also enhanced CMS operation.

By TIM PALMER

The approach to producing this enhancement to performance was to run hardware and software monitors, in order to determine which parts of the operating system would offer significant performance improvements if they were re-implemented in microcode. The result using VM-ECPS is claimed to be an improvement of up to five times and a reduction of up to 50% in total VM supervisor time.

Any operating system designed to run on an IBM 370 can be run under VM; there is no restriction to a specific range of proprietary IBM operating systems.

Although CMS is designed primarily for online interaction, there is a CMS batch facility, and it is possible, and indeed is done, to run VM and CMS without any other operating system. However, it is not possible to run CMS without VM.

Within IBM there are large CMS-only systems used for such applications as engineering modelling. At the Watson Research Labs there are three 168s, two of them running VM/CMS only and supporting several hundred terminals, while the third runs MVS with Time Sharing Option.

Where a number of CMS virtual machines are supported, together with a workload running under some other operating system, each terminal is allocated a short time-slice at high priority, while the compute-bound jobs get longer time segments at lower priority. The operator can anyway control the priority given to different parts of the system.

Since VM/CMS is an operating system in its own right, it comes with a number of language compilers. The PL/I optimising and checkout compilers are the same as those under OS; the same three Fortran compilers as are available with OS are supported by CMS, but have additional interactive debug facilities. The Cobol compiler with interactive debug is the same as that under OS.

There is also an assembler, a VS Basic with interactive debug, and a VS APL, and other 360 compilers and packages have been adapted by users to run under VM/CMS.

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Are you sane, mad or slightly disturbed

The impact on working life has been dramatic, primarily on employment opportunities but not least on — as the industrial sociologists would say — the man/job interface. Back in the 1970s, when so-called minis — massive machines, some larger than a wardrobe — were introduced, the mini enthusiasts argued strongly that the large central machine must go the way of the dinosaurs, since user identity was paramount. Within most big companies this issue ruined friendships, produced memos to people of influence which when written by the mini enthusiasts implied that the central DP people were intent on propping up a decaying empire, and when written by the central DP people implied that the mini people would get their fingers caught in the disc drives.

Back in those days, DP was so young that DP people could not recognise a recurring cliche when they saw it. During the 1980s, as each successive wave of mini-minis, and micro-minis, and stand-alone micros hit the market, the claims came up time after time that the last model must go the way of the dinosaurs etc, and that the latest model must, in the interest of user identity etc, be run right down there at the user's desk, without any meddling from above.

In those companies, which could afford the cost and tolerate the traumas of following the decentralisation dogma, the effects become progressively more unsettling. Then as now, the statement of the projected benefits from computer development was an exercise in creative fiction, and the 1980s saw the appearance of the Freudian Computer Decentralisation consultant who tried to resolve the Oedipal conflict between, say, the Father figure of the Production Planning Section who wanted to keep its big machine and the Father rejecting figure of the Tools Requisitioner who, in the interests of user identity etc, wanted his freedom.

Senior management were half hearted in tackling this conflict, since they themselves were facing up to the word processing dilemma. By 1983, it was possible for the manager's written text to be captured by OCR — without benefit of secretary — provided the manager had gone through a two-week course flatteringly entitled "character formation." By 1987, it was possible for the spoken word to be captured and converted into printed text, provided the manager had gone through a three-week course in elocution. Both courses were massively undersubscribed. An influential study by Kowalski, the US behavioural scientists on "The Influence on Management Creativity of the Female Secretary as a Fantasy Object," gave intellectual respectability to this covert opposition.

The impact on the man/job interface was controllable. The impact on employment was not. If we look back to the mid-1970s, we can see three main schools of thought on the question of employment — the Doomsday School which demanded government intervention to stop the world being turned upside down; the Boy Frankenstein School which held that the technologist could not reasonably be expected to put right society's problems, but that if society could only show the same inventive genius as the technologist, then what a world it would be; and the Free Market Forces School which reckoned that all that the world was facing was a redistribution of employment.

With the benefit of hindsight 25 years on, we can see that the Doomsday School were broadly right in predicting the worst, but that they were touchingly optimistic in hoping that governments could break away from democratic inertia. It took, after all, the Ethiopian seizure of the Saudi oil fields before the US government pushed up its gasoline tax to a discriminatory level.

On the other hand, and again with the benefit of hindsight, it was unrealistic to suppose, as the Free Market Forcers did, that each production line job displaced by a robot would be balanced out by a production line job making robots, or that if that job should vanish a job selling robots would emerge to preserve the equilibrium.

Only in the computer industry itself was anything approaching equilibrium achieved. But that equilibrium involved a massive reduction in the manufacturing workforce to the extent that world production depended upon a handful of ladies with keen eyesight and soldering irons in Bataan (a lower labour cost location for the Taiwanese companies); a massive reduction in account executives, regional managers, industrial sector co-ordinators and others with a fine nose for the wine list; counter balanced by a huge increase in merchandisers who laboured away in company tee shirts re-stocking the shelves in the computer discount houses. In most other industries there was still the belief that in the long run the equilibrium might yet come right, but most had the sinking feeling that in the long run, as the early 20th century economist Maynard Keynes had pointed out, we are all dead.

UK government policy towards unemployment can be classified under three broad phases. Between 1978 and 1988, the policy — never formally stated — was to give State support to those industries which were under structural threat from the micro revolution. The support was indiscriminate, and was so costly that this policy is considered to have been instrumental in bringing down the Hattersley government in 1989. The incoming Social Democrat coalition ended that support, and after tacitly recognising the impossibility of creating the new jobs promised in the election manifesto, launched a massive campaign to change public attitudes towards unemployment.

The aims of the campaign were well meant, but it achieved a certain notoriety, in part through its use of the "Lie back and enjoy it" slogan, and in part through employment as Government Leisure Advisers of retired hippies from the early 1970s. The campaign must be adjudged an honourable failure. Not even the legalisation of cannabis in 1991 could shake the influence of the Work Ethic. Hundreds of years of conditioning had convinced the Western world that it was better to work than not to work, since not only would Satan surely find some mischief for idle hands to do, but in the early 90s there was still a marginal financial advantage in favour of working.

In the face of that failure, the government set up in 1995 three new institutions — the Department of Leisure Technology, which gives financial support for the development of devices — such as electronic Patience — which makes idleness more tolerable; the Department of Employment Preservation, which sets the financial levy to be paid by companies, manufacturing or installing labour saving equipment; and the Department of Employment Creation, which compensates companies for every labour saving machine taken out of use.

The most authoritative predictions suggest that society should have successfully adapted to the technical revolution within the next 10 years. Perhaps 20 years, but definitely not more than 50.

The use of the portable micro by football supporters caused initial difficulties, not least in the notorious Millwall riot of 1988 when a police horse was seriously wounded by a micro thrown from the crowd.

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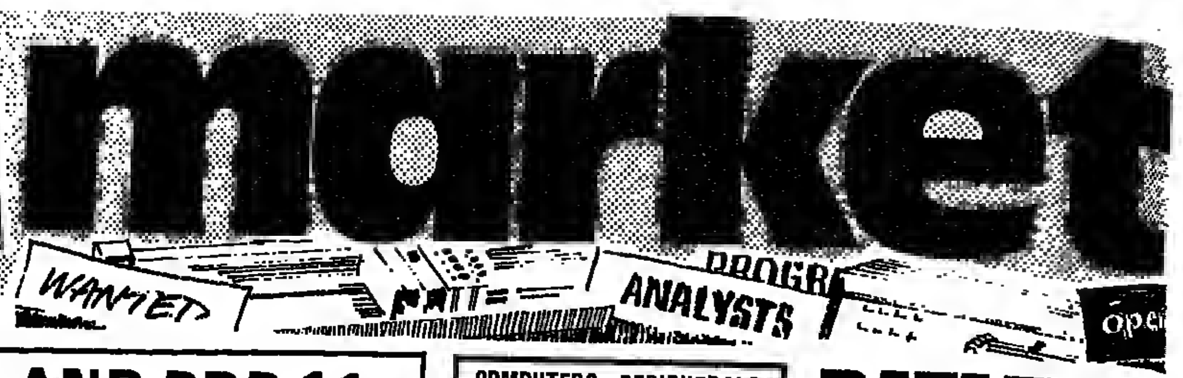

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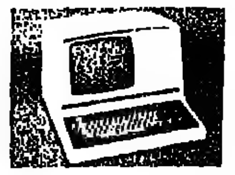

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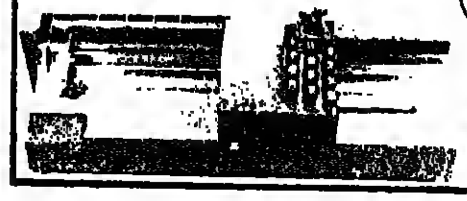

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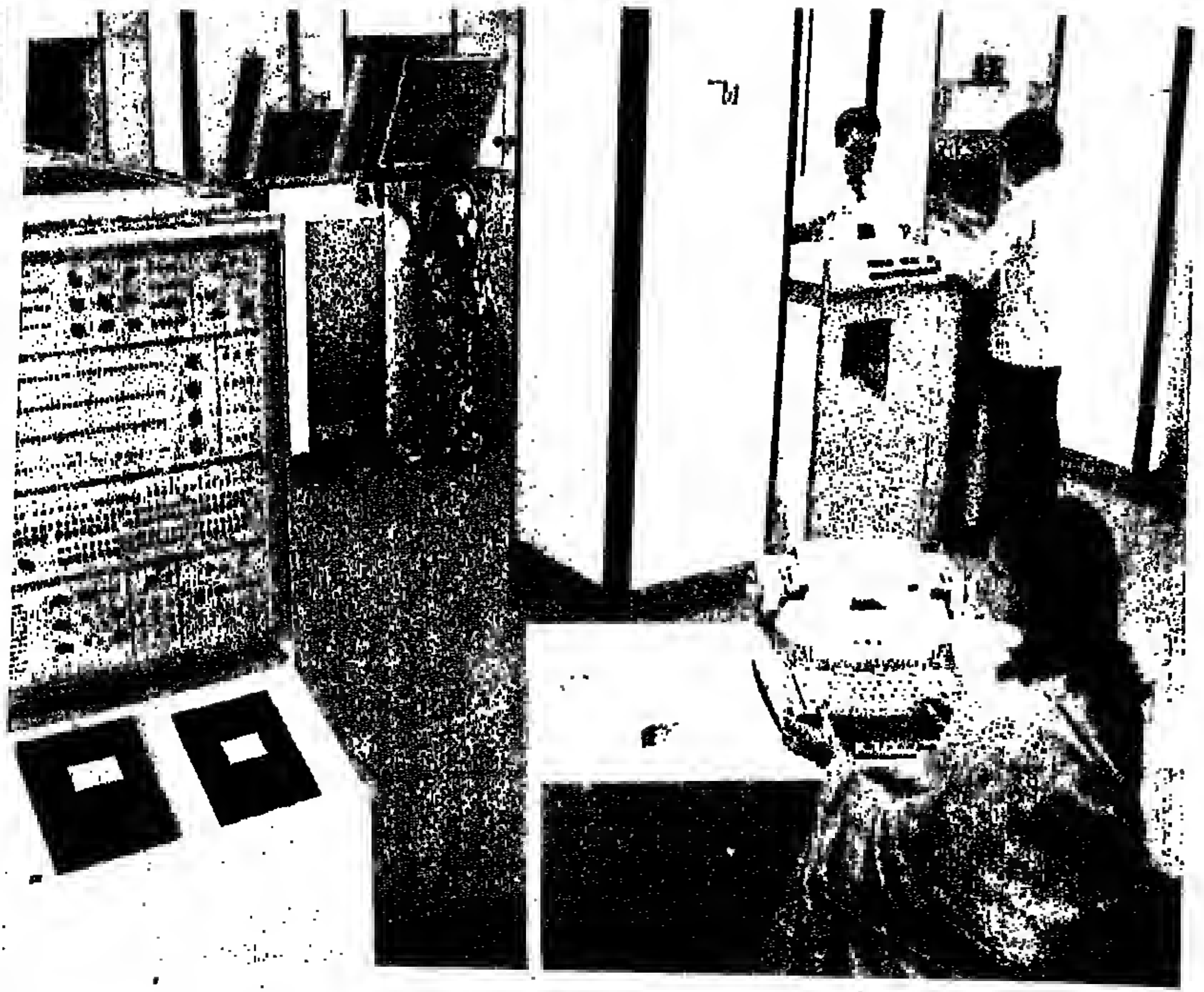
TIM PALMER REPORTS FROM INDIA

COMPARATIVELY little is known in Western Europe or the US about the Comecon countries' unified range of Rjad ES-series computers.

The one country outside the Eastern bloc which has built up thousands of man-hours of experience on the machines is India, where about a dozen ES-series mainframes are installed. The recent EEC computer delegation to India therefore had a unique opportunity to assess the performance of the machines.

Tim Palmer reports here from Delhi, Bombay and Hyderabad. . . .

Paying for Soviet computers in software



This Rjad ES-1030 mainframe at Computronics in Bombay was built in Russia and is equivalent to a small IBM 370/135. The saried lady in the foreground is sitting at an Eastern European teletype cunningly disguised as a typewriter. Indian users of Rjad series computers report some reliability problems with electromechanical peripherals, none of them very serious. As for the processors and memory, users were unanimous in praising the reliability and performance of the Rjads.

SEVERAL of the most capable companies and organisations in India are the ones which have been collaborating with the USSR and East Germany on the development of computer software. Where visible, the Soviet presence is by no means intrusive, and companies were unanimous in describing their Soviet customers as exacting but fair.

There are about a dozen Rjad machines in India, mainly ES-1030s and 1020s from Russia and ES-1040s from East Germany.

Almost all of them have been or are being paid for with software written in India for use in the Soviet Union.

It also appears that although there is a shortage of computers within Eastern Europe, Indian orders are given priority over domestic requirements, the reasons being that the Soviet Union has a large balance of trade deficit with India, which exports consumer items like soap and toothpaste, and because there is a genuine need for the software that Indian companies are developing.

Heading the list of Comecon computer users is Computronics, claiming to be the biggest Indian exporter of software, which signed a £600,000 contract with the Soviet Union in April.

Computronics handles most of the imports of Eastern Bloc computers and intends to bring in three more in 1978 and seven in 1979 and 1980.

Computronics has an ES-1030 in Bombay, an ES-1022 in Delhi, an ES-1020 in Bhilai and an ES-1010 in Allahabad. The 1022 comes out as the most powerful machine; it is the successor to the 1020, but is rated as faster than the 1030 on sort-merge applications under DOS, and slots somewhere between a 360/40 and 360/50.

The ES-1030 is equivalent to a small 370/135, the 1020 to a 125, and the 1010, although software-compatible with the other ES machines is really a minicomputer, and is based on Mitra-15 licences from CII in France. Computronics uses it as a real time mini.

Computronics is awaiting delivery of an ES-1033 due in September, which promises at least to match the power of a 370/138, and plans to attach 150 terminals to it over 2,400 bps lines.

It also has ambitious plans to write interface software which will enable the 1033 to be connected to the 1022 in Delhi, running at 4,800 bps, and would ultimately like to interconnect all four centres.

The company is putting 12 man-years of effort into an advanced Computer-aided Instruction system for Moscow which is to be used as a support facility for college lecturers and will include graphics facilities.

> ***Computronics is putting 12 man-years of effort into an advanced Computer-aided Instruction system for Moscow.***

The 1033 will be needed to test out the system, which is due for completion by the end of the year and is worth £1.2 million. It will run under the new virtual OS/ES/VS operating system for the Rjad range, which is similar to OS/VS1.

Indeed it appears that the Rjad range really is fully IBM-compatible and that it is possible to load a disc pack from an IBM 360 on to a Rjad machine running under OS/ES with no modifications.

The CAI system is being written in assembler, will involve 80,000 instructions and must have a maximum response time of three seconds. It is being designed to run in one partition of an ES-1033 or the new virtual ES-1035, and will support 48 terminals.

Computronics reports that the Rjad machines are very well-established and reliable now, and is working on interfacing larger capacity discs than the 29 Megabyte devices available from Bulgaria.

The company has a staff of 200 and plans to double it within a year, as well as providing bureau services on the Rjad machines and marketing the computers to other Indian companies. It provides software support and training on all Rjad machines, and has over 50 trained maintenance engineers.

It is negotiating with Computer Maintenance Corp, the government company which has taken over IBM's maintenance operations, a subcontract which will allow Computronics to continue to maintain all Comecon computers in India. It also plans to manufacture peripherals and data preparation systems.

It is also negotiating software contracts with Siemens on real-time applications and conversion, and with Philips on telecommunications software for the DS 714 switching computer for contracts in the Far East.

Among the most solidly competent organisations the delegation visited was the Administrative Staff College of India, ASCI, in Hyderabad.

Housed in a beautiful old colonial mansion hung with pink and orange and white bougainvilleas, the college was founded in 1957 to enhance the educational facilities for professional managers.

In the early 70s, the college formed a computer group and got its first machine in 1973. It now has an ES-1030 and an Indian designed and built TDC-12, a machine similar to Digital Equipment's PDP-8.

Since the college is a non-profitmaking foundation, it is free from commercial pressures; but, apart from the software it develops to pay for its computer, its work in general has to be justified as socially useful.

The ES-1030 configuration has 256K bytes of memory, a 1.25 microsecond cycle, and is backed with a 29 Megabyte disc drive. However, the college intends to add a 116 Megabyte drive from either Basf or Calcomp. It also supports four tape drives, two card readers, an 890 lpm printer and four local display terminals.

It hopes to get a half Megabyte 1033 with 480 megabytes on disc and direct data entry facilities.

The Electronics Corporation of India, ECIL, TDC-12 machine is a 12-bit mini with 24K words of store and a 1.5 microsecond cycle supporting four tape drives, card reader, 800 lpm printer and a teletype and has Cobol, Fortran and PL/1 compilers.

There are 60 professional computer specialists at the college, 20 of them trained abroad, plus another 60 computer support staff.

The kind of projects which the college has worked on in India and would like to collaborate on abroad are mainly in the area of public administration and utilities.

It has developed a system for calculating optimum pipe sizes and finding the reservoir sites which would produce the minimum water flow unbalance in the water supply system for the city of Chandigarh.

The college is currently working on a management information system for the Andhra Pradesh state government in connection with a minor irrigation project.

The purpose of the work is to collect rainfall statistics, taking into account major rivers, sub-basins, catchments and so forth, calculate the run-off, the water that must be reserved for downstream areas, and then find out how much water is left over which could be channeled into minor irrigation — that is plots of land of between one and 400 acres.

The college has also proposed means by which the data which has been collected, including rainfall records going back 75 years, could also be used in flood forecasting and control.

Other work done in Andhra Pradesh includes the use of statistical techniques for determining the environmental factors which affect the spread of malaria, for which a model was written in Fortran; an analysis of the change in disease patterns over 10 years at a large hospital in Hyderabad; and a personnel records system for all doctors in the service of the state.

All these systems have been designed so as to be at least 70% portable.

System software developed for the ES-1030 includes a simulation package, Simpl/1, for process-oriented discrete simulation. It is designed to be easy to learn and to run on any machine with a PL/1 compiler. It is 80% complete and will take 100 man-months of work, involving 150 routines and 15,000 lines of PL/1.

All the software written for the Russians is benchmarked against IBM systems, and two packages, a project management system and a vehicle scheduling system are claimed to have 10% more features and to be 20-30% more efficient than the comparable IBM system.

The college runs a wide range of computer training courses, and is working with the Iraq National Computer Centre on a program which will involve trainee Iraqi teachers attending the college plus lecturers going to Iraq to provide on-the-spot training.

> ***East meets West with a vengeance at Operations Research Group, ORG, of Baroda. ORG has its own ES-1030, an ICL 1901A and an IBM 1401.***

Another area where ASCI has capability is in the development and use of management games, and the college is keen to participate in major projects in foreign countries, particularly in the field of public administration, where it recognises that it has a need to gain experience in the management of large projects.

Engineers India Limited of New Delhi is a large public sector company which comes under the auspices of the Indian petroleum ministry.

It has a Robotron ES-1040 from East Germany, a machine rated by Control Data as equivalent to an IBM 370/145, and has done a considerable amount of software conversion for this machine.

It has written an IBM 1401 emulator for the 1040, and has converted Fortran packages on the CDC 3600 at the Tata Institute for Fundamental Research to run on the 1040.

The 1401 emulator was written in the 1040 assembly language under DOS, and took 18 man-months to complete.

In Iraq, EIL was asked to do a feasibility study into the computerisation of an oil refinery; the study indicated that it was a worthwhile exercise, and one EIL specialist with one Iraqi designed the system, while three programmers wrote the software for a Univac 9400 which was already installed in Iraq.

EIL has also converted a heat-exchange package from CDC 7600 to IBM 360 for a Dutch company, working only from a program listing, and subsequently received a contract to design a heat exchanger.

System software written includes several packages for the rather limited DEC PDP-11/20 mini. A 5K word real time operating system took four man-years to complete and EIL also wrote a batch operating system, block assembler and on-line debugging system for the 11/20. It is also interested in collaborating on foreign contracts, particularly in the engineering and petrochemical sectors.

Underlining the problems — and the opportunities — that the Indian computer scene presents is a project executed for the Oil and Natural Gas Commission for administration of 250,000 store items. It involved data collection, keypunching and verification at 17 sites, with a courier service to regional centres.

The only problem was that the data needed to be processed on an ES-1030 in Bombay, a Burroughs B6738 in Calcutta and a IBM 370 in Dehra Dun. It was therefore necessary to write two different versions of the Cobol software.

East meets West with a vengeance at Operations Research Group, ORG, of Baroda. ORG has its own ES-1030, an ICL 1901A and an IBM 1401.

A wide range of software has been written for the ES-1030, including a Gasp-4 implementation, requirements planning, bill of materials and capacity planning packages, a GPSS processor and an integrated package for statistical and tabulation computations. ORG has also worked extensively on Varian and Univac machines.

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Three Senior Programmers are required to assist with the development of systems for the data processing department of a rapidly expanding organisation.

Candidates with 4 to 5 years' experience will possess a sound knowledge of IBM COBOL — preferably DOS — and will be able to demonstrate initiative with leadership qualities. An appreciation of teleprocessing will be an advantage as the company has installed TASKMASTER for on-line enquiries and data entry.

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Data Processing Manager

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He/she will be a young energetic Data Processing specialist with at least two years experience at managerial level. It is essential that he/she is capable of a strong and positive contribution and is able to work consistently under pressure.

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Ref· S40607

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The Company, a leading service organisation, offers a range of specialist services to all sectors of Industry. The persons appointed will initially undergo a period of training followed by in-the-field practical experience with senior sales executives.

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COMMERCIAL CONSULTANTS should have at least 3-4 years experience of commercial applications, in any machine environment, preferably with a knowledge of COBOL. Involvement at a fairly senior level with at least one major project would be an obvious asset.

TECHNICAL CONSULTANTS are *required* to have a minimum of 2 years experience of working with MINI's and/or MICRO's, preferably at ASSEMBLER level. The emphasis is likely to be on process control and emulative software, so an awareness of these fields would be useful.

Applicants must show a professional approach to their work and confidence in their ideas **Contact: Andy Wright**

Project Leader

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After almost 15 years successful operation as part of a £200 million organisation, this bureau has recently entered the turnkey market with small business systems based on the TI 990/10 mini.

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It will initially consist of Analysts and Support specialists and will be the direct responsibility of the successful candidate.

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Technical Adviser

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One of the leading computer manufacturers is continuing to expand its support function and has an opportunity for a person to join a small team responsible for a new product in the range. The system, which incorporates a mini-computer, has many sophisticated hardware and software features.

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Knowledge of the computer operations area would be an advantage.

Salary is negotiable according to experience. Large company benefits **Contact: Jim Baker**

Technical Author

Surrey **£6,500-£7,000**

A major international group requires a Technical Author for the preparation of manuals relating to computer applications used throughout the U.K. group. The applications include batch and real time systems and distributed processing using advanced design concepts. Highly technical manuals for use by implementation and support teams, and manuals for end users of group standard systems are to be produced.

This position would be of interest to authors of proven ability in communicating complex technical information in a form appropriate and readily understandable to the areas for which the publication is intended. Knowledge of applications relating to materials management of IBM computers is highly desirable.

First class opportunity to enter an attractive career situation. Generous relocation will be paid where appropriate **Contact: Mike Creamer**

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All areas **up to £5,000**

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This is an exciting chance to join a professional organisation and receive first class training. Subsequent assignments will be available in most parts of the U.K. Excellent salaries and large company benefits

Contact: Jim Baker

For further information on any of the above vacancies please contact the appropriate consultant.
If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

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Minimum two years experience in hardware design, programming in assembly language of micro computers. Diagnostics programming a definite plus. BSEE or equivalent desired.

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Application forms and further particulars may be obtained from the Registrar, The University, Leicester LE1 7RH, to whom completed applications should be returned as soon as possible and not later than 24 July, 1978, quoting reference SACW.

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A Senior JCL Clerk is required in the IBM 370/158 installation at the American Express - Card Division Operating Centre in Brighton.

Suitable applicants must have a detailed understanding of JCL as applied to the IBM OS/VS1 System together with a good understanding of IBM utilities and be able to set-up and check JCL. The person appointed must have the ability to resolve problem situations quickly and accurately. All applicants will have at least three years D.P. experience and must be prepared to work a rotating three shift system.

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You should have:

- ★ a minimum of 3-4 years' programming experience, preferably with PL1 and some ASSEMBLER knowledge.
- ★ experience of MODULAR programming techniques and have an understanding of STRUCTURED programming methods.
- ★ IBM background and SUPERVISORY experience would be a distinct advantage.

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Applicants should either:

- ★ be currently working in a DOS/VS environment and have the desire to be involved with the OS/MVS system .. OR
- ★ be currently employed in a systems programming role with 12 months experience of operating systems and system generations/releases.

The successful candidate will become a member of the technical software team and have specific responsibility for investigations, problem solving, generation of CICS and the tuning and enhancements of software packages.

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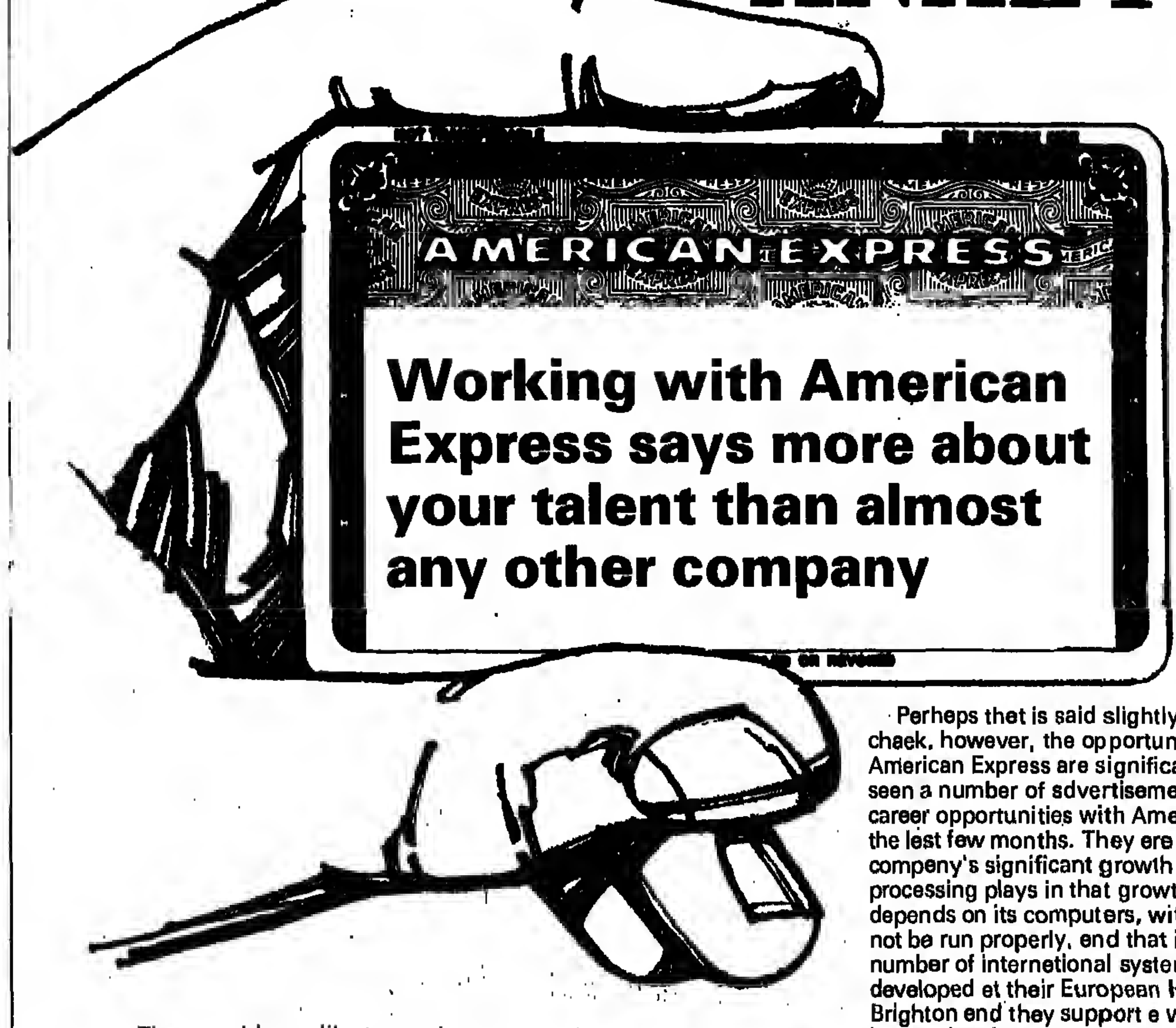
[illegible]

PROGRAMMERS AND ANALYSTS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Working with American Express says more about your talent than almost any other company

Perhaps that is said slightly with tongue in cheek, however, the opportunities available at American Express are significant. You may have seen a number of advertisements for computer career opportunities with American Express during the last few months. They are an indication of the company's significant growth and the role data processing plays in that growth. The company depends on its computers, without them it could not be run properly, and that is no exaggeration. A number of international systems have been developed at their European Headquarters in Brighton and they support a wide range of international centres.

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We hope we have said enough about American Express and the opportunities to interest you. We would like to meet you quickly. Therefore, interviews will be arranged either in Brighton, in London or the provinces, whichever is most convenient. Please contact John Goldsmith either by telephone or by sending a brief history. You will not be asked to fill in a form until we have met you.

SALARY — Well, what are you worth, *you* tell us, you can be assured that the salaries are competitive and attractive plus an excellent range of fringe benefits.

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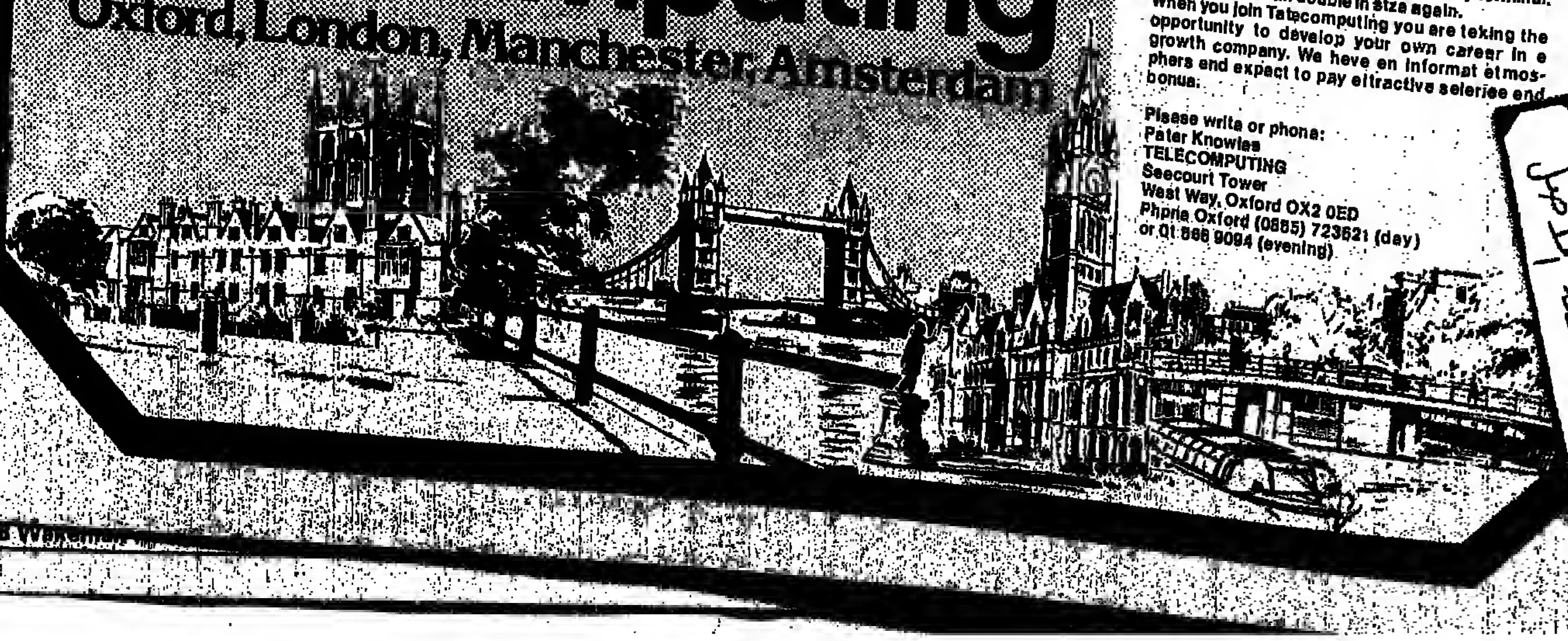

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Please telephone or write to [illegible], Technical Manager, Computer Instrumentation Limited, School Lane, Chandlers Ford, Hampshire. Telephone Chandlers Ford 66321

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Apply in the first instance to Frank Booty, the Editor, on 01-261 8000 or write to him at Systems International, IPC Business Press Ltd., Dorset House, Stamford Street, London SE1 9LU.

THE STOCK EXCHANGE

The Stock Exchange is currently running two machines — a 2 megabyte 370/158 under OS/VS1 (RTAM) and a 2 megabyte 370/148 under VM/CMS also with OS/VS1. With a large increase in the overall workload forecast for the near future the 370/148 is due to be replaced by a new and more powerful machine. Because of these developments they are seeking to fill the following positions.

COMPUTER OPERATOR

circa £4300

The requirement here is for a good all round operator who has the flair and potential to progress into a more senior position in due course.

A minimum of 1 years OS experience is needed, preferably on the larger IBM 370 mainframes and any knowledge of VM/370, TP or OS/JCL and Utilities would be welcomed.

There are three shifts working a 24 hour shift pattern on weekdays only, and overtime will also be possible.

Due to the expanding nature of their operations, opportunities for career advancement are readily available for the right people and this, coupled with the prospect of valuable experience on new hardware and software, will make the advantages of this position obvious.

SHIFT SUPERVISOR

circa £6000

Here is an opportunity for an experienced Shift Leader to progress at once into a Junior Management position.

Responsible for an online shift of up to 8 or 9 people you will need to be mature and efficient, and be able to organise and motivate your shift in order to meet tight deadlines for sensitive work.

A good practical knowledge of both OS/JCL and Utilities is a must, and equally important is a thorough command of the OS/VS1 Operating System. Knowledge of Hardware Switching concepts and Tele Processing would be advantageous.

Obvious benefits inherent to this position include immediate supervisory responsibilities, plus the longer term advantage of seeing new Hardware and Software implemented and developed.

SYSTEMS PROGRAMMER

circa £5000

Covering a wide area of responsibility this position would suit people with quite diverse backgrounds in Systems work.

Essential requirements are a good knowledge of either OS or OS/VS1 Operating Systems and of OS/JCL and Utilities, together with current VM/370 experience. Also a minimum of 1 years programming in ASSEMBLER language plus experience writing in PL1 will be expected.

Part of the work will involve analysing and improving overall system performance, so any knowledge of IBM/370 Hardware and Software fundamentals is desirable, as is any experience of performance measurement and estimation techniques.

Since there will also be an element of user contact involved, the ability to communicate effectively at various levels would be an advantage.

If you are interested in any of these positions please either write to:–

datascene
DATASCENE RECRUITMENT LIMITED
Sceptre House 169-173 Regent Street London W1R 7FB

or telephone 01-439 7871

SURREY

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Computer Applications Development

up to £7,050

We are looking for a Research Officer to assist in the use of mini/micro computers for real time data handling both in the laboratory and on power stations.

The successful candidate, male or female, will be expected to specify suitable hardware/software systems, and will be involved in their implementation, development and future support.

Candidates should possess a good honours degree in an appropriate discipline. An in depth knowledge of PDP 11 hardware and assembler language is essential, together with experience of real time computing. A sound knowledge of Fortran is required and a knowledge of electronics would be an advantage.

The job is based at the Scientific Services Department, Ratcliffe on Soar, which is in a pleasant rural location between Nottingham and Loughborough.

Salary on appointment will be within the range £3,570 - £7,050 dependent on experience plus self financing bonus.

Please apply in writing quoting vacancy number 12/78MR, giving details of age, qualifications and experience, to the Personnel Manager, Central Electricity Generating Board, Haslucks Green Road, Shirley, Solihull, West Midlands B90 4PD.

CENTRAL ELECTRICITY GENERATING BOARD
Midlands Region

THE OPEN UNIVERSITY
FACULTY OF MATHEMATICS

RESEARCH ASSISTANT

Computer chess has long been used as a well-defined, yet complex, area for Artificial Intelligence Research. Much recent work has concentrated on endgames as a sub-area in which the techniques used in current relatively successful chess-playing programs have proved strikingly ineffective.

A research assistant is required to work on a project in this field entitled "Representation and refinement of knowledge for chess endgames".

The post will be based in Milton Keynes.

Candidates should have a first degree in a relevant field and a good working knowledge of at least one high-level computer programming language. The successful applicant will be encouraged to register for a higher degree.

The post is tenable for two years with an initial salary in the range £3,189-£4,801 per annum.

Application forms and further particulars are available from **The Recruitment Office (M83679/2), The Open University, P.O. Box 75, Walton Hall, Milton Keynes MK7 6AL, or by telephone from Milton Keynes 63408, or there is a 24-hour answering service on M.K. 63868.**

Closing date for applications 25th July, 1978.

SYSTEMS ANALYST/ PROGRAMMER

AP5/SO1 £4,525-£5,245 incl.

This post offers a challenging and rewarding opportunity to participate in the development of the full potential of an ICL 2903 computer. Applicants should have some experience of systems analysis as well as programming.

Generous disturbance allowance/relocation scheme in operation. Possible assistance with housing.

This is a readvertisement, previous applicants need not apply.

Application forms, returnable by 21st July, are available from Personnel Section, Manor House, Swanscombe, Kent DA10 0BS. Tel. Greenhithe (0322) 842431.

DARTFORD Borough Council

[illegible]

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The Project involves the implementation and training of staff and the successful applicant will be interfacing with American banking professionals. The position is for a two-year contract in the first instance with the possibility of joining this International Consultancy in a permanent position on completion of the Project.

REF: W40607

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Telephone or write to:- 30 Fleet Street London EC4Y 1AA **01-353 0981 (24 hrs)**

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SGS is the German subsidiary of SG 2 — a DP services organisation with approximately 1 500 staff. We are currently undergoing major expansion and require

ANALYST/ PROGRAMMERS

to work on a variety of real time applications in Germany.

Successful applicants will have 3-4 years experience of assembler programming on minicomputers with good knowledge of system software on any of the following: PDP11, Honeywell 716, Philips [illegible], Siemens, [illegible] and should have worked on Real Time, Process and Production Control or Data Communications systems. Fluency in German is desirable but not essential. Above average salaries and relocation expenses will be paid.

Contact: P. S. Perugia, Managing Director, SGS Datasystems GmbH, Friedrich Str. 10, 6000 Frankfurt/Main, W. Germany. Tel. (0611) 725244.

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Employment is on a contract basis, initially for a period of three years. Attractive expatriate inducements which include low cost accommodation make up the package.

Write for an application form and further details quoting reference CO 778, to:—

The Manager, Zambia Appointments
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Computer Systems

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Applicants should have a good educational record and experience in commercial data processing. Familiarity with data networks and terminals would be an advantage. However, the most important qualities we are seeking are tenacity and the ability to communicate with all levels of user in the data processing world. People with relevant experience, but lacking formal qualifications should not be deterred from applying.

Ferranti is a major British manufacturer of computers and a European leader in real-time computer applications. The team is based at our offices in a pleasant part of South Manchester within easy reach of open country and good residential areas.

A competitive salary will be offered and a productivity bonus scheme is in operation. A company car will be provided. Relocation expenses are available for staff coming from outside the area.

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FERRANTI
Computer Systems

DatasolveDatasolveDatasolve

A better environment for Analyst/Programmers to £6,500

Physical environment alone makes this job unusually attractive. Our Client's small, elegant offices are located in the heart of the Thames Valley countryside, among some of the most beautiful scenery in England.

But if you're the kind of Analyst/Programmer our Client is looking for, your primary interest will be in the challenge of the job itself.

And here, the attractions are just as great.

Our Client has just ordered a System 3, Model 15 and a remote System 34 to handle an ultra-sophisticated inventory control and order processing system. One of the most urgent tasks facing the new Analyst/Programmer will be to implement this system – a task which will involve detailed systems and programming design. Future work within our Client's DP department will involve design, development and support for extensions to this system, and for developing equally exciting existing new systems. In addition you will provide on-going support to the Company's other European computer centres. The position reports directly to the Company's European Data Processing Manager.

Our Client is looking for a man or woman who can exploit the potential of this role to the full – and who can within a year or two become the Company's Systems Designer, and then its DP Manager. Analyst/Programming experience in RPG 11 is essential, and a knowledge of COBOL would be useful.

The starting salary will be up to £6500, and the benefits package will appeal to someone starting to take a long-term view of his or her career.

If you're interested please phone James Plummer on 01-491 4706, or write to him at:

Knight

Knight Computer Services Limited
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Staff Services Division of BOC Datasolve Group and a member of the Computing Services Association.

Zeus-Hermes

*AN INVITATION TO TALK TO US IN OUR OWN OFFICES AT 2-10 CAPPER STREET, LONDON WC1 on THURSDAY / FRIDAY, 13 / 14 JULY BETWEEN 12 NOON AND 8.30 P.M.**

Zeus-Hermes is a leading Software House and Consultancy which has specialised in Real-Time Software and Mini-Computer Systems since 1969. Now in 1978 one-third of our staff are engaged on MICROPROCESSOR projects. We are still continuing our planned expansion and require people who are keen to succeed in the areas in which we specialise.

SYSTEMS PROGRAMMERS UP TO £7,500

Candidates should have substantial experience in Assembly code or Machine code and preferably also in the development of Software. Specific experience in Minicomputers such as PDP 11, NOVA or Interdata, or micro-processors such as Intel 8080 or Motorola would be of great interest as would knowledge and experience of: COMMUNICATIONS SOFTWARE, TERMINAL EMULATORS, COMPUTERISED TELEPHONY, MESSAGE SWITCHING, HARDWARE DIAGNOSTICS, WORD PROCESSING and TYPESETTING.

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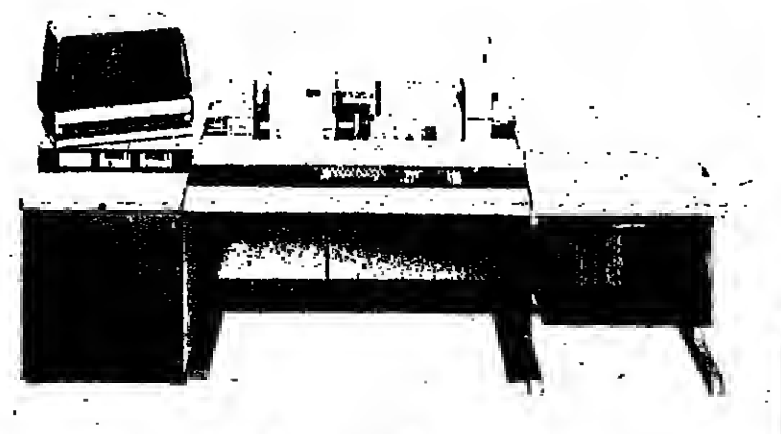
These positions offer the opportunity to work on original systems from the design phase on, with a dynamic organisation whose professional and responsible attitudes, together with imaginative forward planning, have created a highly successful company. Work is in Greater London and the Home Counties, and opportunities frequently occur in Holland and Belgium which additionally offer generous overseas allowances.

If you cannot get in on these days, or if you would like further information in advance of 13 July, do telephone Charlie Ebbutt or Maureen Chapman (01-323 0637); or write to us.

**Capper Street runs eastwards off Tottenham Court Road between Goodge Street and Warren Street stations.*



Senior Analyst Programmers

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Adler Business Systems need men and women with experience in data processing.

A wide variety of work is involved including packages, system design and bespoke programs.

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Write or telephone (reverse charges if you're long distance). Interviews can be arranged locally if required.

Mirza H. Fur, UK Field Systems Manager
Adler Business Systems Ltd.
Jorden House, 47 Brunswick Place, London N1 6EG
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Adler Business Systems Ltd

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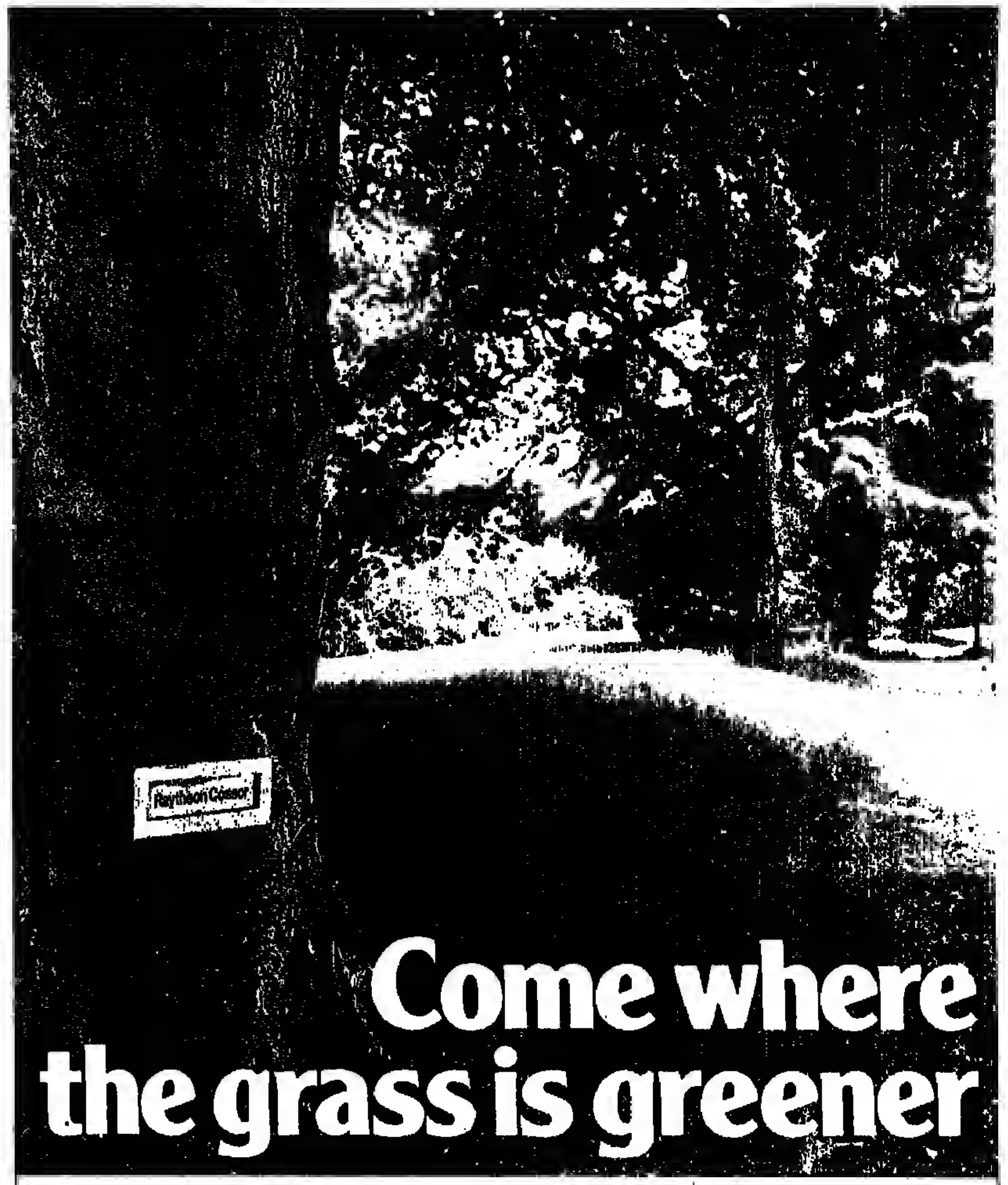

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Applications will cover:

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Analysts will have at least four years relevant experience, preferably with recent responsibility for the work of other staff.

Programmers will have one to three years experience.

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The best products demand the best possible technical support. We need **Senior Software Specialists** for pre- and post-sales support to users and to our own sales and project teams. Candidates will have rare qualities: the ability to learn our product software totally, to troubleshoot in a wide variety of client environments, to advise creatively on proposed systems and products. They must be energetic and mobile. Ideally, candidates will have worked in technical support with a minicomputer manufacturer. Rewards and prospects will be excellent.

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Write to: W. D. Barrow
Raytheon Cossor Data Systems
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DATA 100

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Please write to, or telephone, Mike Bray at our Head Office

Systems House, 57-61 High Street, Frimley, Surrey GU16 5HJ
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Salary — around £6,000 p.a.

Location—Croydon

We have ambitious plans to extend the use of computer techniques at MJN. We are upgrading our

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RPG II ANALYST/PROGRAMMER

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As major mechanical engineering contractors we recognise the important part which the success of our computing developments has to play as we expand our activities not only at home but especially overseas in the Middle East and Africa

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MJN

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The Job:
To form part of a small team developing financial applications.

The Person:
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The Society operates its on-line and batch systems on an IBM 370/148 using CICS and DOS/VS.

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For further information ring Worthing 64441 x 237
Tony Koch — Data Processing Manager

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To. £7,000 p.a.

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FCS

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CONTACT: Sheila Bradbury for the Manchester position on 061-833 0676.
CONTACT: Valerie Hall for the Kent position on 01-935 0671.

Ref. No. CW/7/2

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LONDON 01-935 0671
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Computing Services Association

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In addition the engineer will be required to develop hardware and software for a variety of minicomputer and microprocessor systems.

A degree in Electronic or Electrical Engineering or Computer Science is normally required for this post. Experience of computer hardware and software would be an advantage.

Salary £3,675 - £4,086 plus pay supplements of £516 or £520 p.a. Phase 3 review expected 1st July, 1978.

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CDC SCOPE 3.4/NOS-BE

SYSTEMS ANALYST

- ★ We are looking for a suitable applicant with at least two years relevant experience with CDC software to fill the post of Systems Analyst at our London Processing Centre using a CDC CYBER 175 and associated peripherals.
- ★ The job involves being responsible for Software Maintenance and associated system installation projects.
- ★ A very attractive salary, plus benefits associated with a large International Company will be offered to the successful applicant.
- ★ If you consider yourself suitable, and wish to know more, write in confidence to

G. Baum — Operations Manager
Compagnie Generale de Geophysique
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Applications are invited for the following

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SALARY In accordance with the Burnham FE Report £4101-£7086 bar £7672 per annum

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MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

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SOUTH LONDON **c. £4800 + Bonus**

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Programmers, with a minimum of 18 months' COBOL, will gain analysis experience and close user contact, particularly at system implementation time. Career prospects are excellent as full traning will be given where appropriate.

The company is a major international organisation, whose growth rate has exceeded expectations due to the rapid advancement of specialist technology of which they are the leader in their field

Located in modern, air-conditioned offices, the company's terms of employment include an annual bonus, a non-contributory pension scheme and paid overtime.

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Any job which is confined to systems programming alone could lead into a cul-de-sac.

The Opportunity

Our client has thought carefully about this. They realise that it is difficult to offer career development in the technical support area in a user environment. However, as a large international financial organisation, they now feel that they are able to offer a genuine and interesting career opportunity for someone who has worked in a technical support role, either as a Systems Programmer or as a Senior Programmer.

The Job

Middleware is being developed to interface CICS with on-line applications. Our client wishes to continue the development of this middleware to cover real time options.

About You

They want to meet someone who really understands CICS and can integrate applications development with CICS. In this case, for systems such as a real time Foreign Exchange Dealer System. There is no doubt that to enable you to work effectively you would have to learn about applications systems which makes the job that much more demanding. A knowledge of VSAM and DOS/VS would certainly be an advantage and someone who is working in a teleprocessing environment will find the challenge offered very substantial.

The Reward

Our client is looking for someone who feels that their technical background is being frustrated by the lack of career planning with their current employer. They realise that the development of technical skills is just as important as moving into line management. The salary offered is circa £6,000. In addition to that there is a bonus of up to 6% of basic salary during the first two years. After that time it can be as high as 15%. There is also a low interest mortgage scheme, currently 3%, plus other significant benefits which include subsidised lunch and interest free season ticket loans.

The Prospects

Benefits alone are not sufficient to attract the right person and our client has given serious thought to career opportunities. These may be running their Technical Support Group, or moving into applications development at a later date. Our client is large enough to enable either of these possibilities to be realised.

If you are interested and would like to know more about the position please contact John Goldsmith at Goldsmith Recruitment International Ltd. Ref. 1769.

WE ARE ALWAYS INTERESTED IN HELPING YOU WITH YOUR CAREER

Computing Services Association

Goldsmith Recruitment International Ltd.,
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TIME as a problem solver....
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[illegible] the South East, [illegible] and the West Country, Birmingham and the Midlands. Atkins On-Line [illegible] UK timesharing and batch computer bureau offering a full range of management, commercial and engineering [illegible] business world. We have recently joined forces with On-Line Systems Inc. of Pittsburgh, Pa. and our clients now have access to [illegible] throughout the UK and USA as well as in Canada and Holland.

We are [illegible] professionals with proven [illegible] records, preferably but not necessarily in the computer services field, to expand our existing young and progressive team.

We are offering an attractive basic salary plus commission scheme which could mean a total income in excess of £10,000 based on sensible sales targets. A company car is provided together with comprehensive product training and the usual company benefits.

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For Birmingham and West Midlands
Gerry Naylor, Area Sales Manager, Atkins-On-Line,
Regency House, 101 Hagley Road, Edgbaston,
Birmingham B16 8TA. Tel. 021 454 6011.

For Bristol
Allen Brown, Regional Manager, 58 Royal York Crescent,
Clifton, Bristol BS8 4JP. Tel 0272 312241.

And find out more

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Systems Programmer

Bahrain: c. £12,000 Tax Free

Aluminium Bahrain is one of the leading industrial organisations in Bahrain and the Gulf. In addition to the main production plants, this 120,000 tonne/yr. producer of primary aluminium has its own infrastructure which includes power generation and distribution, marine facilities, and water distillation. There are more than 2500 employees.

This new appointment is crucial to the development of the company's computer facilities. The computer is an IBM370/115 using DOS/VS and POWER/VS. A number of functions are already computerised, another eight are under development and it is proposed to progress the installation towards data base and on-line systems. Reporting to the Head of Computer Services, the Systems Programmer will play a key role in this development. He will also be responsible for manufacturers' and in-house developed software, and will undertake the design through to implementation of any special programs required.

Applicants must be high-calibre systems professionals with specific experience of IBM software, programming techniques, Assembler language and data base operations. Membership of the BCS, a degree or the equivalent would be preferred.

Salary will be negotiable around the figure given above and will be dependent upon experience and qualification. At the present time there is no income tax in Bahrain and money is freely transferable. Benefits include rent-free air-conditioned housing, 40 days' home leave per year, free schooling or education assistance, free medical care, life assurance and provident fund.

Please write, with full career details, to D. H. Jones, Alba Smelter Services Limited, 22 Grosvenor Street, London W.1.

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CAMPBELL-JOHNSON RECRUITMENT ADVERTISING LIMITED
35 NEW BROAD STREET, LONDON EC2M 1NH

University of Bristol

Applications are invited for the post of

TEACHING ASSISTANT IN COMPUTER SCIENCE

within the Department of Mathematics tenable from 1st October, 1978. The successful candidate will provide assistance with the various computing courses provided for undergraduates including some program advisory work and the writing of programs for use in teaching within the Department.

Applicants should have an Honours Degree preferably in Computer Science, and also programming experience in both a high-level language and assembler.

The salary for the appointment will be £3,189-£4,801 p.a. or £3,660-£5,282 p.a., the initial placing depending on age, qualifications and experience. Applicants with a relevant Ph.D. can expect to be appointed on the higher scale.

Further particulars may be obtained from The Secretary, University of Bristol, Senate House, Bristol BS8 1TH, to whom applications should be sent by 28th July, 1978.

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We're a world wide manufacturing concern with plants in nine different countries. In England alone we produce a vast range of products including bearings, universal joints, forming and swaging products, as well as many 'specials'.

Our computer department is at present involved in floor reporting for the company using COBOL on an IBM system, DOS/VS, and a fully integrated Database Total Management System. And we're about to take on responsibility for other terminals in the UK and Europe.

We're growing fast. That's why we need new staff. And we're prepared to pay for the right people.

Both positions include excellent salaries, sick pay, contributory pension scheme, four weeks' paid holiday, and real promotion prospects. Plus the possibility of travel to Europe and the USA.

SENIOR SYSTEMS ANALYST

You'll be responsible for defining and ultimately solving data processing problems. This will involve feasibility studies and tests on existing as well as up-and-coming systems. You'll also be in charge of training the appropriate personnel.

To be successful, we think you'll need a minimum four years' industrial experience, a keen analytical mind, and the knack for co-operation.

SENIOR PROGRAMMER

Working with the senior systems analyst you'll be writing, and implementing various systems, including software. Because systems are prepared for all three UK Torrington plants, this will mean close liaison with users in other locations.

You'll also be called upon to do a certain amount of new system analysis, often on outside software packages.

And you'll be training personnel. So you'll need experience in controlling people and setting standards for other programmers.

If you're looking to get on in computers, it will pay you to talk to Torrington. Telephone Rollin Goodall, Management Services Manager or Mrs. Jo Wright, Personnel Department on Coventry (0203) 74241 now for more details.

Applications are welcome from both men and women

Torrington

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SALARY TO £6,899 plus extra 10% after three months' satisfactory employment.

OON COMPUTER SERVICES LTD. provide the Data Processing requirements of the Geo. Bassett Group of Companies which includes Confectionery, Cake and Biscuit manufacture, distribution services, toy importing/exporting, and agencies in major European locations, U.S.A. and Australia.

The equipment is an ICL 1903A with 64K, discs and tapes operating under a George II system, together with a SCANNER which is to be utilized in the development of on-line systems.

An extremely interesting and challenging 5-year development plan has been launched, covering most aspects of the Company's operations and the Project Leader appointed will be responsible to the development of systems within the financial area.

Great importance is placed upon the ability to develop financial models to aid in corporate decision making, and ideally candidates will have experience of using ICL's PROSPER package.

Initially the team will consist of the Project Leader and one other Systems Analyst with programmers being allocated as and when the need arises.

Benefits include flexible working hours, 28 days' annual plus normal statutory holidays, and a generous re-location scheme where necessary.

For an application form and job description please phone Sheffield (0742) 349391 or write to:

Mrs. S. Cookson
Personnel Officer

Geo. Bassett & Co. Ltd.
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CROYDON

Systems Programmer

to £7,500

New IBM 3032: CICS/VS: VTAM: VSAM. Extensive terminal network being developed

An organisation serving almost 2 million customers is taking delivery of an IBM 3032 in August to augment its existing 370 equipment. There is an emphasis on the development of on-line systems and it is planned to have over 500 terminals by 1979. The present software environment includes VS1, CICS/VS, VTAM, VSAM and projects during the next 12 months include MVS, database, distributed processing, etc. The planned workload requires an additional Systems Programmer to join the team. Essential experience is at least 3 years in systems programming, with experience in as many of the stated software fields as possible. This is a highly responsible position, and candidates must be well motivated and able to work with a minimum of supervision. Candidates should be of the calibre to progress to Senior Systems Programmer within two years. The conditions of service are excellent, with generous holidays, sickness scheme, pension, etc.
Ref: 738/CW/Neville John

[illegible]

Real-time Programmers

£4,000-£6,000

Berks - Herts - West London

There are opportunities at the above locations for people with mini or micro computer experience to work for a computer manufacturer.
Applicants should preferably be graduates with at least 2 years' Assembler real-time programming experience which can be based on any mini computer. In addition any application experience would be useful particularly in the area of communications. We would also be interested to hear from people with microprocessor experience.
These vacancies exist for all levels of programmers to Project Leaders. Salaries in excess of the figures quoted could be negotiated for exceptionally well qualified applicants. There are also openings for recently qualified graduates with degrees in Computing science who wish to train as programmers.
Ref: 114/CW/Sandy Lloyd

N.W. LONDON

Senior Systems Analysts

to £8,000

European network, IBM 370's and PDP 11's

A major manufacturer of industrial chemical products has a Europe-wide network of PDP 11/40s and medium sized IBM 370s operating in a distributed processing environment. Senior Analysts are urgently required for the London installation to develop and implement business systems for the six main manufacturing locations in Europe. Applications will cover accounting, marketing and other commercial systems. Successful candidates will have at least four years good systems experience. A graduate would be preferred. Although the positions will be based in London, there will be a certain amount of European travel involved. The ability to converse in a European language would be an obvious advantage.
A relocation package will be offered. Other benefits include flexible working hours, a staff restaurant, four weeks holiday and a contributory pension scheme.
Ref: 738/CW/Marian Tabone

HARLOW

Software Programmer

to £5,750

Any low level language considered

A Software Programmer is required by one of the U.K.'s leading IBM service bureaux to join a small team at the start of a TP project, to develop software for a MEMOREX 1380 Intelligent Control Unit. On completion of this project the successful candidate will either move into the area of systems programming, or IBM software development. The person appointed will have a good technical background, ideally IBM. Experience of ASSEMBLER language would be preferred, although applications from candidates with Usercode, Plan, or any other low level language would be considered.
An allowance will be given for relocation purposes. Other benefits include flexible working hours, a staff restaurant and a contributory pension scheme.
Ref: 737/CW/Marian Tabone

SALES & TECHNICAL SUPPORT

London - Sales Support

to £6,000

Reading - Technical Support

£3,300-£5,500

Our clients are looking for experienced junior project managers and sales support staff to be responsible for providing system implementation support and specific pre-sales support for a number of large manufacturing customers. The positions are London based and call for specific knowledge (both hardware and software) of one or more of the 1900, 2903, 2900 DME ranges.
Ref: 522/CW/Renee Nute

Technical support positions based in Reading (Berks) are open to experienced personnel with a background in operating and/or Systems or Programming on ICL 1900, 2903 or 2800 ranges.
Ref: 528/CW/Renee Nute

GERMANY

to c £14,000

Our Client, a European based consultancy organisation currently wishes to recruit a number of personnel for projects based in various German locations. Positions will be offered on a 1 or 2 year renegotiable contract basis, some of which may offer opportunities for tax free earnings during the contract period. Knowledge of the German language is useful but not essential

Basic Software

Located in Southern Germany. Software Designers and Programmers are required to develop, implement and test Basic and Applications software for a new range of mini and mainframe hardware which is to be used on a worldwide basis for process control and real time commercial and technical applications. Basic software experience could include operating systems, compilers, database communications, macro libraries, etc. Programming experience in a low level language or Algol is desirable.
Ref: 381GA/CW/Roger Allington

PDP 11

Ideal start would be September 1978. Experience using PDP 11 hardware is essential preferably under RSX11D/M or RT11, using Fortran or Macro 11. Applications are mainly on-line and real time commercial systems.
Ref: 381GB/CW/Roger Allington

TC 800

Analyst Programmers with Olivetti TC800 experience are required to develop, from design through to implementation, commercially oriented applications involving on-line and real time processing.
Ref: 381GC/CW/Roger Allington.

Univac 1108

Fortran required for technical applications being developed in Southern German.
Ref: 381A/CW/Roger Allington

IBM-IMS

Commercial projects in Holland and Germany require PL1/Cobol experience. DL1 and systems generation experience would be useful.
Ref: 381B/CW/Roger Allington

● ICL SYSTEM 4 & 2900

Programmers & T.P. Consultants

£4,000-£8,000

READING (Berks) — A number of vacancies exist with a Software House for young candidates with COBOL and/or USERCODE Programming experience on ICL SYSTEM 4. Consideration will also be given to candidates with an IBM background who have been programming in COBOL and/or ASSEMBLER. The positions are based in Reading (Berks) with an opportunity to work on customer's projects on site, in various parts of the U.K. Long term projects will involve retraining on other hardware such as large 2800 systems (£4,000-£4,500).
Ref: 524/CW/Renee Nute

A number of vacancies also exist for 2900 experienced programmers to work on conversion packages. The positions are Reading based.
Ref: 525/CW/Renee Nute

LONDON — we are also looking for Senior professionals with a first class T.P. ASSEMBLER background and/or software experience on large ICL 2800 systems. The ideal person will probably have worked on one of the following: Large scale Teleprocessing, Linking processor to mainframe, Real Time operating Systems. (to £8,000).
Ref: 528/CW/Renee Nute

● Engineers

London - Liverpool - Manchester Sheffield - Hemel Hempstead

c £4,000 + Car + OT

A number of opportunities exist for experienced customer service engineers to work for computer manufacturers. They will be based at the above locations and will travel to customer sites within a reasonable distance.

Candidates must have an HNC or HND or degree in Electronic Engineering or a related area. In addition 3-5 years experience working on any mainframes and peripherals would be desirable however product training will be given.

Other vacancies exist to work in other locations. In some instances production, design, development and commissioning experience would be useful together with a good background in electronics.
Ref: 113/CW/Sandy Lloyd

To apply for any of the above positions or for further information, please telephone the Consultant concerned on 01-242 9358 (office hours) or write to the above address. If it would be more convenient to telephone in the evenings, the telephone numbers are: Neville John — Farnborough (Kent) (66) 52017, Roger Allington — Berkhamsted (04427) 2299, Renee Nute — 02-874 6372, Sandy Lloyd — 01-691 5166, Marian Tabone — 01-555 5568.

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EITHER:

- ★ Experience of managing a team of programmers and senior programmers.
- ★ Experience in computer system design and documentation.
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OR:

- ★ Detailed expertise in a specific technical area e.g. use of telecommunications, data base, distributed processing etc.

SENIOR PROGRAMMERS
TO £6,250

- ★ Capability of supervising 2/3 programmers.
- ★ Experience in writing program specifications.
- ★ Reasonable knowledge of an application area.
- ★ 2 years' programming experience, preferably in COBOL, RPG, BASIC or CORAL.
- ★ 'A' levels or equivalent.

This is an ideal opportunity for you to join a dynamic team with excellent career opportunities. Although the majority of projects are within the London area, opportunities do exist for you to undertake European and other international assignments should you so wish. If you work away from home, generous allowances are paid.

Interested applicants should contact ROY HIGHFIELD and interviews will be arranged as soon as possible in the strictest confidence.

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As parr of a prestiga inrcrnanonal group of companies. our clienr is now racruiting for programmers with 2/3 years' PL/1 exporionce and hopelully some ASSEMBLER lor rho davelopmenr of manufecturing systems on tha IBM Series/1 minicomputer
- ★ Excellenr opportunity to be trainod on mini compuler
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- ★ Excellent career opportunirias including chance of working with microcomputers
- ★ Salary to £7,000.

Ral 1697

SNR. ANALYST/PROG WEST LONDON, BERKS.

Internelional company wirh outsranding reputation for elficiency. growth and investment are seeking senior analyst programmors to work within IBM 370 inatallation. Good experience of PL/I or COBOL or ASSEMBLER is essential togother with ability to work on own initiative and supervise statt. Working on teleprocessing and time sharing systome with opportunity to work on small business mochines. Company offors
- ★ Exciting growth potential.
- ★ Excellent promotional prospects.
- ★ Non-contributory life assurance, sickness and pension schomo.
- ★ Good working conditions.
- ★ Salary to £8,000.

REF. 1568

SENIOR ANALYSTS MIDDX.

Our client, a major organisation situated close to both M4 and M3 motorways, is seeking a senior analyst to act as PROJECT LEADER on a wide range of applications. If you have approximately 3 years' systems experience, preferably in ICL 1900 series environment, and are able to demonstrate a professional approach to project management, apply NOW. Company offers
- ★ Job security with a prestige concern.
- ★ Responsibility.
- ★ Excellent working conditions.
- ★ FREE Lunches, FREE Life Assurance.
- ★ Salary £6,500 + COMPANY CAR.

REF. 1629

SYSTEMS ANALYST LONDON

Our client, a prestigious Merchant Bankers, are seeking a Systems Analyst who has financial/banking environment experience. They retain IBM 370 under OS but will consider other hardware experience. Company offers
- ★ Full banking benefits including subsidised mortgage.
- ★ Excellent working environment.
- ★ Job security with prestige concern.
- ★ Salary £7,500.

REF. 1594

★ SALARY

JNR. PROGS. LONDON

Challenging careers await persons with approximately 12 months programming experience on ANY MACHINE, ANY LANGUAGE with drive and enthusiasm who want to follow a positive career path. Opportunities as follows
- ★ TRAINING in TP and database
- ★ Development work on new sophisticated systems
- ★ Career progression with forward thinkers.
- ★ Up-to-date technology.
- ★ Salary to £4,500

REF 1550

ICL PROGS. LONDON

Due to development of their advanced computer systems, successful D P services dept. seeks to boost its programming team. Retaining large ICL 1900 equipment they offer excellent opportunities for persons with minimum 2 years' ICL COBOL experience. Company offers
- ★ Opportunity to join at senior level
- ★ Training on IDMS database.
- ★ Development to analysis
- ★ Applications in various areas providing an absorbing and interesting career
- ★ Excellent perks include flexible hours and **6 WEEKS' HOLIDAYS.**

Salary £6,500.

REF. 1549

SYSTEMS ENGINEER W. GERMANY

World-wide manufacturing company with offices in Frankfurt seeks engineer for sophisticated communications systems. Ideal applicant should have in-depth experience of communications and message switching on any mini. Good knowledge of GERMAN is essential. Company offers
- ★ Relocation expenses.
- ★ Good career prospects in this company with excellent growth potential.
- ★ Generous fringe benefits.
- ★ Salary to DFL 60,000 (£15,000)

REF. 1578

PROGRAMMERS MIDDLE EAST

We would like to meet computer professionals on behalf of our clients with around 4 years' ICL 1900/2900 experience to discuss long and short term assignments in the GULF area of the Middle East.
- ★ Scope in a variety of areas.
- ★ Conversion plans.
- ★ Accommodation and expenses paid by company.
- ★ Renewable assignments.
- ★ Salary c. £12,000 TAX FREE.

REF. 1598

★ CAREER OPPORTUNITY

MINI PROGS. HANTS.

Our client is a major British company with business interests in many areas. They seek programmer with at least 18 months' DEC PDP II and BASIC + experience. This hardware is newly installed and thus offers a chance to become involved in the development from the beginning. Company offers
- ★ Wide range of projects
- ★ Flexible hours
- ★ Excellent career prospects
- ★ ANNUAL BONUS
- ★ Salary c £5,000 p a

REF 1586

PROGRAMMERS MIDDLE EAST COUNTRIES

Our client is a major international organisation with offices throughout the world. They seek programmers and analysts in BAHRAIN & JEDDA where their market is growing strongly. Ideal applicants will have COBOL and/or NEAT experience on NCR small business machines to work on an interesting variety of projects in a financial and commercial environment.
- ★ Renewable one year permanent contract
- ★ Fully furnished accommodation provided at the company's expense.
- ★ 30 days' LEAVE per annum
- ★ Salary paid in Bahrain Dollars c. £12,000 TAX FREE

MINI PROGRAMMER CITY

Our client, a well-established financial group, is setting up a new company to deal with a rapidly expanding area. Super opportunity for programmers with any mini experience, preferably using BASIC, but training given. If you want a CHALLENGE and to be involved from the start — PHONE NOW!
- ★ Training in RSXII & RSTS.
- ★ Great career prospects—promotion on merit.
- ★ Banking perks, free life assurance and L.V.s.
- ★ Salary to £8,000.

REF. 1582

PROGRAMMER ESSEX

Well-known manufacturing concern retaining IBM 360 hardware seek programmer with approximately 2 years' ASSEMBLER experience (Cobol an asset) to work on applications in two separate divisions, i.e. wholesale and manufacturing. Currently installing Burroughs minis in all their depots for distributed processing.
- ★ Training on COBOL.
- ★ Opportunity to go on to MINIS.
- ★ Excellent career opportunities.
- ★ Flexi-time, profit share, staff canteen.
- ★ Salary to £5,300.

REF. 1622

For details of the above positions please telephone our London office 01-734 0152/3010 24 hours

SALES PERSON HOLLAND

As Europe's largest suppliers of contract computer personnel to Holland, we require an additional sales person for our Amsterdam office. The successful applicant will have good computer experience, preferably with a sales background. He or she will be self-motivated and keen to travel. Remuneration will include a generous guaranteed basic income, and a substantial commission. We will expect a successful person to earn in the range £15-£25,000 p.a. A car will be supplied.

Please reply to:

The Directors Knight Programming Support Ltd. 27 Noel Street, London, W1

Computing Services Association

CONTRACT DIVISION

هكذا منذ الأزل

OVERSEAS

SYSTEMS ANALYSTS MESSAOE SWITCHING & COMMS.	BELGIUM	£450 p.w.
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U.K.

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IBM SYSTEM 3 RPG II	HERTS.	£200 p.w.
IBM OS COBOL	BERKS.	£200 p.w.
SYSTEMS ANALYST DATABASE DESIGN	N. LONOON	£230 p.w.
BURROUGHS 6700 COBOL	S. LONOON	£200 p.w.
ICL 1900 GII MAXIMOP	S. WALES	£180 p.w.
ICL 1900 GII COBOL	S. WALES	£230 p.w.
PDP II ASSEMBLER OR MACRO II	HERTS.	£240 p.w.

Phone now for immediate and future contracts
Ring Christine Kay/David Hayton 734 0152 (24 hrs.)

KNIGHT PROGRAMMING SUPPORT LIMITED

27 NOEL STREET, LONDON W1. TELEPHONE 01-734 0152/6 (24 HOURS)
OFFICES AMSTERDAM, PARIS, MANCHESTER, BIRMINGHAM

OF LEWISHAM

Town Clerk and Chief Executive's Department

Senior Systems Analyst

Ref CE263/CW

£5494-£6055 (under review)

We are about to embark upon a number of interesting and varied new projects and are currently increasing our Systems staff strength. A vacancy exists for an experienced analyst capable of leading a project team through all stages of development to final systems implementation. Seven years' relevant experience is required and candidates should be able to demonstrate a record of successful achievements.

We operate a 35 hour flexi time week, provide over five weeks' annual leave, a subsidised restaurant, and free car parking facilities.

The installation comprises an IBM 370/138 processor and the usual peripherals and operates under DOS/VS

Senior Programmer

Ref CE274/CW

£5494-£5797 (under review)

Tired of commuting in the rush hour? How about joining us? We provide flexi time working hours, over five weeks annual leave, a subsidised restaurant and free car parking facilities at Catford, South East London.

We are looking for a capable Senior Programmer who has the potential to lead other programmers within a project team. Our project teams are responsible for the design and implementation of a wide variety of challenging systems which are written in COBOL for an IBM 370/138 computer. As Senior Programmer you would be expected to have or acquire knowledge of BAL and COBOL, provide guidance to programmers under your control and assist with the training of junior staff.

If you think one of these is the right opportunity for you call Lucy Harris, Systems Manager on 690 4343, extension 69.

Application form, returnable by July 21st, and detailed job description from Chief Personnel Officer, Town Hall, Catford, London SE6 4RU or telephone 01-690 7966 (24 hour Ansafone service) quoting appropriate reference and job title.

SALOP COUNTY COUNCIL

SENIOR ANALYST/PROGRAMMER

Salary up to £5,512 per annum
(Phase 3 pay award pending 1st July, 1978)

These additional posts are required to enable the Council to embark on a major new development program. The duties will include the detailed analysis, design, programming, implementation, and maintenance of the whole of minor projects or part of major projects. The positions will provide an ideal opportunity to gain team leadership experience over a wide variety of applications in an expanding installation.

The Council operates an IBM 370/138 computer with a substantial remote terminal network which provides a service to both County Departments and District Councils. Major enhancements to both hardware and software are planned. The emphasis of the new development is on interactive management information systems, and these posts will play a key role.

Salop has plenty of cheap housing in predominantly rural surroundings, and generous assistance with removal expenses will be given in approved cases.

Applicants should have several years' good systems and programming experience. Although further training appropriate to the Salop computer will be given, experience of PL/1, Assembler, DL/1 or CICS would be an advantage. Vacancies also exist for applicants with shorter experience on similar lower graded posts.

Application forms and further details may be obtained from the County Treasurer, Shirehall, Shrewsbury, Salop SY2 6ND (telephone Shrewsbury 222235), returnable by 19th July, 1978.

NORTH MIDLAND CO-OPERATIVE SOCIETY LIMITED

Require

COBOL PROGRAMMER

We require a programmer with a minimum of 2 years experience in COBOL and a knowledge of RPG 11 would be advantageous.

We operate an ICL 2903 with 2 EDS 60s and 5 D.D.E.s located at Talke, Stoke-on-Trent.

We are a rapidly expanding retail organisation with a trading area in North Staffordshire and Cheshire.

Salary is negotiable.

Applications to the

Personnel Officer
North Midland Co-operative Society Limited
10 Newcastle Street
Burslem
Stoke-on-Trent ST6 3QG

FREELANCE PROGRAMMERS

£150 to £400 p w

Fast, F exp. All computers UK & OVERSEAS

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SYSTEMS ANALYSTS PROGRAMMERS OPERATORS

Register with a company who want to work for you!

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VIP CONSULTANTS INTERNATIONAL
(Agency)
01-491 2208
Don't sit on the fence!

The Royal Borough of KENSINGTON AND CHELSEA

CONTROL CLERK

Up to £3430 p.a. inc.

An enthusiastic person required to join our Computer Operations Department which is running an IBM 370/138 under DOS/VS POWER and CICS. Minimum of six months' computer experience preferred, probably gained on a similar system. 35 hour week. 21 days holiday, subsidised restaurant and licensed sports and social club.

Phone Nigel Trott on 937 5464 Ext. 575 for further information.
Ref: 155.

Senior Programmer

(F76) £3,987-£4,735 inclusive

(salary award pending)

(salary grade AP 4/5 plus outer fringe area allowance and salary supplements)

This is a new post requiring a person with at least three years' experience of COBOL who has the ability to lead a small programming team. Duties will include an involvement in Systems design and the maintenance of programming standards.

The Council will shortly take delivery of a Honeywell 64/20 and conversion of existing systems from Series 200 is now under way. The new equipment will enable further systems to be developed and communications facilities to be introduced.

This post attracts 100% removal expenses, generous assistance with resettlement expenses and temporary accommodation where appropriate.

PLEASE WRITE OR TELEPHONE FOR JOB DESCRIPTION AND APPLICATION FORM TO THE PERSONNEL OFFICER, CRAWLEY BOROUGH COUNCIL, TOWN HALL, CRAWLEY, WEST SUSSEX RH10 1UZ. TELEPHONE CRAWLEY (0293) 29744 Ext. 122 (24 HOUR ANSWERING SERVICE)

CLOSING DATE 19th JULY, 1979.

CRAWLEY BOROUGH COUNCIL

EUROPEAN SOFTWARE SUPPORT

WORDPLEX is an international company which markets one of the most sophisticated ranges of stand-alone and multi-user word processing systems and is the European market leader in this area.

The European Support Centre for WORDPLEX is based in London and provides technical and marketing support to the WORDPLEX distributors in almost every European country. The small Software Support Group requires two more people

SUPPORT ANALYST

£5000-£6500

We require a Support Analyst to work with our distributors on Pre- and Post-Sales support of large accounts. Applicants for the position must be prepared to travel extensively in Europe and should have a good software background. Some knowledge of European languages would be an advantage.

SOFTWARE PROGRAMMER

£5000-£6500

A Software Programmer is required to work on further developments on the system. Applicants must be well experienced in Assembler languages, preferably on mini or micro processors, and should have experience in operating systems and communications programming. Applicants should be prepared to travel frequently in Europe.

In addition to salaries offered the positions carry an excellent benefits package including Life Assurance, relocation assistance and an annual bonus.

If you are interested please write with brief career details to
Geoff Marshall
Software Support and Development Manager

WORDPLEX EUROPE
Station Approach
Stonebridge Park
LONDON
NW10 4UY
Tel: 01-903 9855

wordplex europe

Canterbury City Council

Senior Systems Analyst/Programmer

AP5/SO1 £4343-£5055 (incl.)
(pay award pending)

Applications are invited for the above position from suitably qualified and experienced persons. The Council operate an ICL 1901A computer at the present but this is to be replaced in October 1978 with an ICL 2903 using EDS 60s and VDUs linked by a 7502 to the mainframe. The new computer will be housed in a purpose built computer centre on the outskirts of the attractive City of Canterbury. This position offers a first class opportunity for a computer professional to obtain job satisfaction from working on complete projects and also to become involved in the Council's plans for the implementation of on-line systems.

A Casual User Car Allowance is payable.

Consideration will be given to housing accommodation and a generous disturbance allowance scheme is in operation.

Closing date 7th July, 1978. Interview date 17th July, 1978.

Application forms may be obtained from the Personnel Officer, 3 Mmlawe Avenue, Canterbury, Kent CT1 2ON. Telephone: Canterbury 51760 Ext. 12.

Centre Européen pour la Recherche des Cadres

cerc

systems programmer

International banking group in Brussels is looking for a systems programmer to assist with the development and maintenance of real-time financial systems. He is to develop, implement and document systems/application software and to provide technical support for computer operations. Twin NCR criterions are in use.

Applicants are expected to have at least 2 years experience in NCR NEAT-3 and should be familiar with NCR operating systems. Some knowledge of TP and NCR terminals would be an advantage.

Individuals with similar experience on non-NCR equipment will also be considered.

Salary offered corresponds to his experience and value with a 13th month and several extra-legal advantages.

Call for more information or for an appointment n° 031/39.00.16 Saturday or Sunday from 14 to 16 pm. On weekdays 02/539.04.69 from 9 to 18 pm. or write under reference BD/1873 - Systems Programmer.

CERC - rue de Livourne 75 - 1050 Bruxelles.

ENGLAND, AUSTRALIA SOUTH AFRICA & NEW ZEALAND £4,000-£12,000

Prescot Computers have helped many computer professionals to obtain employment in South Africa and Australia and we have now expanded our coverage to New Zealand. Prospects are particularly good for **Programmers, Systems Analysts, Analyst Programmers, Consultants and Sales People.** Salaries generally range from £4,000 to £12,000 p.a.

We have just returned from an extensive trip to South Africa, Australia and New Zealand and would like to speak to you if you are interested in working in these countries.

Remember — we also operate in the U.K.!!!

Why not telephone **Chad Stolper** on **01-242 2142** for an informal discussion. Alternatively, if you prefer write to him at

Prescot Computers Limited
6 Bloomsbury Square
London WC1A 2LP

01-242 2142 **Telex 23110**

Plan your career with Prescot

NORWICH UNION LIFE INSURANCE SOCIETY

invites applications for the position of

SENIOR COBOL PROGRAMMER

The successful applicant for this permanent position will join a small team and will be responsible for maintaining and enhancing existing programmes.

The current main application is a life accounting on-line system and in the near future the present Honeywell G1/58 will be up-graded to a 62/40.

At least 3 years knowledge of Cobol programming essential and experience of Honeywell equipment is desirable.

Replies with full details in writing and marked 'confidential' to

The Secretary,
Norwich Union Life Insurance Society,
P.O. Box No. 112,
Dawson Street, Dublin. 2

PROGRAMMERS ANALYSTS PROJECT LEADERS

£4,500-£8,500

A branch of the largest supplier of DEC mini-computers in Europe require experienced computer staff to design and implement commercial systems using on-line techniques on DEC hardware.

A knowledge of RSTS, BASIC, DIBOL, COBOL and SQUASH is desirable. Don't let your knowledge of other machines prevent you learning something new.

Our offices are in Thames Ditton, Surrey, which gives easy access to London and the South East where most of our projects are concentrated.

Other benefits include Contributory pension scheme, travel expenses and discretionary bonus scheme.

For more information and application form please write to Gemma Business Systems, 27 High Street, Thames Ditton, Surrey, or ring Tony Simpson, 01-388 7235 (daytime) or 01-458 7493 (evenings).

Freelance Programmers

Contracts in LANCS and YORKS.
Honeywell 66.
Top rates.
Fraser Williams Recruitment
Tel: 0742 25069

Systems Programmers

Exciting career opportunities for Software Specialists in Ford's Product Development Group

Ford's Research and Engineering Centre is located at Dunton in South East Essex. Here, automotive professionals work on designing and engineering the cars of tomorrow.

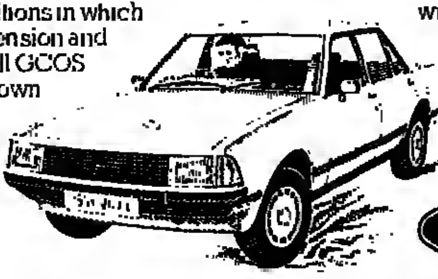
Our computer service provides support to design and test engineering activities in Britain, Germany and Belgium. To meet targets in line with Ford's drive into the 80's the data processing requirements of these locations are increasing every year. In order to meet these demands we now wish to appoint 2 experienced Systems Programmers to strengthen our team of software specialists.

If you are a software professional with a degree or equivalent, or alternatively have at least 3 years experience of programming COBOL or FORTRAN, this is an ideal opportunity for you to broaden your computer experience by working with the Honeywell GCOS operating system. Our current hardware is a 256K Honeywell 6060.

These are challenging positions in which you will be involved in the extension and development of our Honeywell GCOS operating system to meet our own specific needs, as well as resolving problems of usage and malfunctions if and when they arise. The job will also involve you in the role of "consultant" advising users, engineers, analysts and supervisors on the effective utilisation of the system. Therefore, you must demonstrate the ability to communicate lucidly and effectively in detail at all levels. You will also be involved in a limited amount of travel within the UK and will visit Cologne in Germany occasionally. The ability to speak some German would naturally be useful, but this is not an essential qualification.

These jobs offer genuine promotion prospects either within the computer activity or in other related areas. We offer initial salaries of up to £6,500 p.a., dependant on qualifications and experience, together with a full range of fringe benefits including Ford's Special Car Purchase Plan and relocation assistance, where appropriate.

If you are a Systems Programmer looking for better rewards and greater professional scope, then please write, giving full personal and career details to: Paul Kite,
Staff Personnel Officer, Room 15/162B,
Research and Engineering Centre,
Ford Motor Company Limited,
Laindon, Basildon, Essex.



Ford

REQUIRED

MINI COMPUTER PROGRAMMER

with one to three years' experience in Fortran and/or Assembly language, preferably on Data General equipment.

Position will require specialised training in Oilfield related work, and will be U.K. based, with 15-25% international travel necessary.

Applications in writing only, to:

Mr. C. R. Hacker, Manager Computer Services
Sperry-Sun International Inc.
Steam Mill, Great Yarmouth, Norfolk NR31 0HP

Birkbeck College
(University of London)

PROGRAMMERS

Two appointments are to be made, each associated with a specified group of departments.

In both posts the work involves a wide variety of applications. Computing systems to be used include CDC 7600, 6600, IBM 370, ICL 2980, DEC 4080. Candidates should be honours graduates in Computer Science, or have equivalent experience or qualifications. Salary at an appropriate point on the scale £3,664-£5,061 including London Weighting.

For further details telephone 01-580 6622 extension 264. Applications, by letter, to Central Computing Services, Birkbeck College, Malet Street, W C 1.

Department of Psychology and Decision Analysis Unit Brunel University

RESEARCH FELLOW/ ENGINEER

This post is funded 50% through a European Research office sponsored project of Interactive Computer Modelling of complex decision problems, and involves the development of interactive computer systems for Decision Analysis and Bayesian Statistical Analysis. The other 50% is funded through the Department of Psychology for maintenance of those systems and associated user data bases on the Department's PDP12 and IBM 5110 Computers, for giving general instruction and advice to potential users, and preparation of tapes and literature for distribution to other institutions.

Candidates should have a knowledge of Bayesian Decision theory, decision analysis techniques, and have experience with systems implementing decision aids and/or interactive Bayesian statistical analysis. A good knowledge of BASIC is required. Experience with DEC OS/8 and IBM 5100/5110 operating systems is also highly desirable.

The appointment is for an initial period of 16 months from 1st August, 1978, with the possibility of extension. Salary will be within the RA1B scale (£3214-£4611 plus £450 London allowance), with the initial appointment within the first four points on the scale.

Letters of application with a curriculum vitae (one copy) to the Assistant Secretary (Establishment), Brunel University, Uxbridge, Middlesex UB8 3PH, not later than 14th July, 1978.

ANALYST/PROGRAMMER POWER STATION SIMULATION

LEEDS

The North Eastern Region of the Central Electricity Generating Board designs Real Time Operator training simulators of power station plant at their premises in central Leeds. The simulators are for installation in Electricity Authorities both in the United Kingdom and throughout the world.

IF YOU HAVE:

- A sound working knowledge of FORTRAN.
- The ability to communicate effectively with engineers of other disciplines.
- BCS Parts I and II or an appropriate degree.
- A broad interest in engineering.

WE ARE OFFERING:

- "Hands-on" operation of a large mini-computer.
- Opportunities for home and international travel.
- The opportunity to broaden your knowledge and experience.
- The opportunity to develop your own ideas from concept to implementation.

SALARY RANGE:
£4231 to £6215 p.a.
Point of entry depending on qualifications, experience and training.

HOW TO APPLY: Please write giving brief details of qualifications, experience and salary to:

The Regional Personnel Manager,
Central Electricity Generating Board, North Eastern Region,
Beckwith Knowle, Otley Road, Harrogate HG3 1PS,
quoting reference SVN/514/ Applications should arrive
not later than Friday 21 July, 1978.

CW

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ASSEMBLER PROGRAMMERS

£4000 to £8000

Manufacturers & Systems Houses need mini or micro people

UK & OVERSEAS

01 995 3883

FREEPOST LONDON W4 3BR

UNIVERSITY OF KEELE
Computer Centre

Applications invited for post of

DEPUTY DIRECTOR

In the Centre, and for two

SYSTEMS PROGRAMMER

posts. The University computing service is based on a DEC 4085 system, two PDP11s, a CTL Modular One and an ICL 7905 linked into the North West Universities Computer Network. The Centre has considerable commitments in both systems and applications to networking, and to the development of computing facilities for the new machine.

Salary Scales:
Deputy Director: Grade III; £7,074-£8,730 per annum.
Systems [illegible] Grade IA/II: £3,660-£7,064 per annum [illegible]
Application forms and further particulars from: The Registrar, The University, Keele, Staffordshire ST5 5BG. Closing Date 12th August, 1978.

DATA CONTROLLER

Can you combine a proven flair for detailed work and full responsibility to Customers?

Send CV to M. D. Wegmer, Professional Data Services Ltd., 4 New Burlington, London W1X 1FE.

MODCOMP

MINICOMPUTER PROGRAMMER

required by international computer manufacturer to implement MANUFACTURING, ORDER PROCESSING and INTEGRATED ACCOUNTING SYSTEMS for their European Operations

Sound experience in COBOL and FORTRAN is essential, together with practical knowledge of accounting procedures, including profit-loss accounts and balance sheet.

It is expected that you will make a real contribution in the setting up of the manufacturing computer systems

Commercial computer bureau experience would be an added advantage

Location is in WOKINGHAM; some travel to U.S.A. and Continent could initially be involved.

SALARY will naturally depend upon your capabilities and relevant experience. MODCAMP offers very competitive remuneration packages

Please send details of your qualifications and experience to

G. A. Klyn

MODULAR COMPUTER SERVICES INC.
The Elms, Broad Street
WOKINGHAM, BERKSHIRE

LOUGHBOROUGH UNIVERSITY OF TECHNOLOGY

Control Systems Design

Applications are invited from electrical and mechanical graduate engineers for RESEARCH ASSISTANTSHIPS tenable up to 2½ years under a Department of Industry contract in the University's Department of Engineering Production. The project is concerned with the production of software packages for industrial designers of high performance servo mechanisms. Previous experience in interactive computing, electric or hydraulic drives would be an advantage. The successful applicants may be able to register for a higher degree.

Salary within scale £3189-£4130 (under review). Further details and application forms from Professor R. Bell, Department of Engineering Production.

Loughborough *Leicestershire*

Further your Career in Computers

If you have at least 18 months experience in an ICL multi-programming environment operating under "GEORGE 2" we can offer you career prospects as a COMPUTER OPERATOR with commencing salary on a career grade according to experience eventually rising upon recognised proficiency to £4508 plus 1977 Supplement. Will operate an ICL 1902T computer on a two-shift basis 0800-1800 hrs/1500-2300 hrs Monday to Friday.

The post is located at the Town Hall, Euston Road, NW1 (close to good main-line and tube/bus service) Ref 1C/81/CW

For application form please telephone our 24-hour recruitment answering service 01-837 9988 or send postcard to the Chief Executive, London Borough of Camden, Town Hall, Euston Road, London, NW1 2RU, stating post and appropriate reference number.

camden - an equal opportunity employer

Applicants are considered on the basis of their suitability for the post regardless of sex, race & marital status. Also registered disabled persons with the necessary attributes are welcome to apply.

ANALYSTS & PROGRAMMER/ ANALYSTS TO £8000

Whether you have seen many years' experience in systems and are looking for greater variety of work on interesting and challenging projects — or whether you are a GOOD programmer hoping to move up the scale into analysis . . .

we have OPPORTUNITIES in.
Surrey, Sussex, South West London & the City

PROGRAMMER/ ANALYSTS

With at least 2 years' COBOL, PLAN or ASSEMBLER language to work in IBM/ICL/BURROUGHS or MINI environments.

- IBM people with CICS — salaries to £8000
- ICL 1900/2900 series COBOL programmers, preferably with FILETAB can expect between £4650 and £6050

ANALYSTS

Senior people, with the potential towards systems consultancy and major project management. Men and women with a solid background in systems design are required by a number of our clients to take on responsibility for implementation and development projects. Experience in FINANCIAL, BANKING or INSURANCE fields an advantage.

Full details can be obtained from

COLIN SHINGLETON on 01-946 4424
Meteor Computer Consultants Ltd.
Barry House
20/22 Worple Road
Wimbledon SW19

JBA

Programmers and Analyst/Programmers

London, Manchester and Birmingham. **up to £6,000**

Our client, one of the leading computer services organisations in Europe, is continuing to expand its development group and therefore has vacancies for Programmers and Analyst/Programmers to work on a number of varied commercial projects.

Candidates should have at least two years in the design and programming stages of commercial systems such as accounting, stock control, production, etc. A background in high-level languages particularly COBOL, PL/1 or RPG 2 would be an advantage and typical applicants could have experience on IBM or DEC computers. For the Analyst/Programmer positions it is essential that applicants have been involved in the design of at least one commercial application. Knowledge of on-line, real-time and teleprocessing would be an asset.

Ability to communicate with users and clients is desirable since these appointments involve customer contact.

Salaries are negotiable according to experience. Large company benefits. Opportunity to travel. Excellent career progression.

If you would like an informal discussion about the Company and vacancies please telephone:-

Jim Baker,
JAMES BAKER ASSOCIATES,
International Personnel Consultants,
16 Maddox Street, London W1. Tel: 01-491 4478.

SOFTWARE SPECIFICATIONS ENGINEERS

Sperry Gyroscope recognises the growing importance of the definition of software requirements and the maintenance of control documentation, associated with the complex electronic systems currently being designed.

Interesting positions are available in a rapidly expanding software department which is dedicated to a major defence project. The work comprises writing and updating Software Requirements and Test Specifications and liaising with other departments responsible for equipment and system design and operations.

Appointments are to be made at Section Head, Senior and Analyst levels. Suitable candidates should be able to offer experience in software or operational technical specification and documentation.

Sperry offers salaries to match experience, opportunities for career advancement, generous relocation expenses where applicable, and a thriving sports and social club.

For an application form, write to or telephone Don Manning,
Sperry Gyroscope, Downshire Way,
Bracknell, Berks RG12 1QL,
Tel: Bracknell (0344) 3222.
Quote ref. CW/6778

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Computer Personnel Consultants

BUSINESS CONSULTANTS

CITY & WEST END **c £7500**

We are seeking experienced Analysts and Programmers keen to progress their careers to business analysis and consultancy. The Company, a major US bureau, has over 60 mainframes in the States linked to both Europe and Japan. They market a sophisticated range of financial packages for use by senior financial and marketing management. To support the company's very successful marketing operation in London several Applications Consultants are required to support their current expansion.

Ideally you will be outgoing with at least two years' commercial experience. Awareness of business issues together with experience of financial applications would be of particular relevance. Suc- essful applicants will receive extensive training on the company's oducts and will become well versed in their approach to business alysis.

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24-hour answering service

Please telephone for a confidential discussion or write to:
30 Fleet Street, London EC4Y 1AA
01-353 0961

CONTRACTS

HOLLAND

Systems Programmer
With previous experience in a supervisory capacity or as a Project Leader. To work in Amsterdam for a minimum of one year.

Programmer
With a minimum of three years' HONEYWELL LEVEL 66 and G.MAP experience to work in Amsterdam for three months.

Programmers and Analysts
With sound ICL backgrounds. To work on various projects in Europe. Use of a foreign language would be an advantage.

LONDON AND HOME COUNTIES

FORTRAN
Programmer with a minimum of three years' experience, any machines. Preferably with a knowledge of Banking applications. Six months' contract. Immediate start.

UNIVAC 90/30
Experienced programmer required. A knowledge of UNIVAC DATABASE would be an advantage. For three months commencing end of July.

B6700
Programmers with a minimum of three years' 6700 experience to work on various projects in London and the Home Counties.

For further details please contact Bridget Kotchie

RENDECK LIMITED
100 New Bond Street
London W1Y 9LF
Tel. 01-629 5438

Rendeck

WEST WILTSHIRE DISTRICT COUNCIL

RPG 11 PROGRAMMER/ANALYST

SALARY Approx: £5,300 to £5,650 including all Supplements and Shift allowances

The Council operates an ICL 2903 computer with F60s and a 7502 based communicating network providing a computer service throughout the authority.

The Installation is operational between 7.30 am to 7 pm by means of two shifts, i.e. 7.30 am to 4 pm and 10.30 am to 7 pm.

The machine is due to be upgraded to 2904 in late summer and the Council wishes to appoint one experienced RPG11 Programmer wishing to gain experience in the Analyst sphere. The person appointed will have at least eighteen months experience of RPG11, and a detailed knowledge of ICL 1900 to 2903 Software/Utilities will be regarded as equally important.

If you would like to discuss any aspect before submitting an application form: please contact D. BENFIELD, Computer Manager on Trowbridge (02214) 63111 ex. 121.

The West Wiltshire District Council area is situated in a pleasant rural location with easy access to the towns of BATH/BRISTOL and the M4/M5 motorways with reasonable house prices. Removal and lodging expenses can be provided in appropriate cases.

Application forms are available from Personnel Officer
WEST WILTSHIRE DISTRICT COUNCIL
BRADLEY ROAD, TROWBRIDGE, WILTSHIRE BA14 0RD
or by telephone
Trowbridge (02214) 63111 ex. 118)
(Mrs. Tilley)
Closing date 18th July 1978

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POSITION	SALARY	EMPLOYER	LOCATION	HARDWARE ENVIRONMENT	SOME OF THE QUALIFICATIONS	REF. NO.
Analysts	to £7,500 + Free lunches + Stores Discount	Retail Trade	London	IBM DOS	Analysts with the potential to be project managers are required to lead a team of analysts and programmers to develop data base and P.O.S. projects.	27/1
Software Technical Instructors	to c £7,000 + car allow + +	Manufacturer	NW London	–	1+ years' computer educational instructing and course development work or equivalent experience. Working knowledge RPGII and all applications software at functional capability level.	27/2
Systems Analyst	c £8,000 + mortgage + bonus + Free lunches	Insurance	EC2	ICL 1900	Urgently required — analysts with 2 years+ experience in work on financial/insurance systems in an on-line environment.	27/3
Senior Analyst/Project Manager	£12,000++ TAX FREE ACCOM ++	International Airline	Middle East	IBM DOS VS POWER	Extensive experience of airline schedule planning. Previous experience of operational research is essential and statistical background of distinct advantage.	27/5
Technical Analyst/Programmer	to £7,500 +	Software House	London	Minis/Micros	Excellent opportunity for programmer/analysts with 4 years+ experience of assembler/machine code to develop software products on a variety of machines.	27/6
Software/Package Specialists	to £7,000 +	Bureau	W1	PDP 10	Excellent career prospects for people with experience in one of the following areas: PDP8/11s, networks, message switching, communications, etc.	27/7
Consultant	A1 NEG.	Electronics Industry	Amsterdam	–	This European marketing HQ requires a CAD/CAM specialist giving sales support in Europe. Experienced in numeric control of machine tools. Free to travel.	27/8
Analysts & Programmers	to £7,500 + fringe benefits	International Banking	City	IBM & Minis	Exciting career prospects for DP professionals with a minimum of 18 months' COBOL/RPGII experience to develop on-line, real time, banking applications.	27/9
PL1/COBOL Programmers/Analysts	to £6,500	Bureau	N. London	IBM OS	PL1/COBOL programmers urgently required to join this expanding organisation to work on a wide variety of projects using data base and terminals.	27/10
Programmers	to £7,000	Electronics Industry	N. Surrey	Any	First-class opportunities for all levels of programmers to work on advanced software/hardware systems in a challenging and rewarding role.	27/11
Programmers/Analysts	to £8,000 +	Software Services	City	PDP11	Programmers with a sound background preferably on PDP equipment required to develop interesting real-time and communications systems.	27/12
Programmer/Analysts	to £6,500	Building Industry	WC1	ICL 1900	Programmers with 3 years+ ICL COBOL and preferably some systems experience urgently required to develop on-line commercial systems.	27/13
Analyst/Programmers	to £6,000	Insurance	NE Surrey	IBM DOS	Openings for self-starters with a minimum of 18 months' COBOL. Excellent career prospects within this progressive organisation.	27/14
Programmers & Analysts	to £7,000+	Software House	Central London	Burroughs	Excellent opportunities for programmers with 18 months+ COBOL experience to work on a wide variety of commercial projects.	27/15
Contract Programmers	from £180 per week +	Software House	London H. Counties Brussels	Varies	PDP Basic+, RPGII, IBM COBOL, OS, MARK IV, 1900 GII COBOL, Burroughs 880, PL1, OS. Contracts available now.	27/16
Scientific/Technical Programmers	to £7,000 +	Technical Consultancy	Various S. of England	Minis/Micros	Scientific/technical programmers with minimum 2 years' assembler and preferably ALGOL, CORAL, FORTRAN, urgently required to work on a wide variety of projects including process control, simulation, communications. Excellent career prospects.	27/4

CENTRAL LONDON & MIDDLE EAST **UK SALARY**

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ANALYST/PROGRAMMERS **to £6,750+**
PROGRAMMERS **to £6,500+**
+ PROFIT SHARE BONUS

Our clients, an International Software House with Headquarters based in Central London, have signed several turnkey projects overseas and are urgently seeking ambitious people to develop their systems in London. In view of planned expansion staff are required at all levels to join Project Teams to implement systems on site. Applications range from general commercial systems to the more specific: airlines, hotels and financial on-line systems.

Project Leaders
With a background of analysis and programming and experience in leading a team of at least six. Capable of organising turnkey systems including implementation and training.

Analyst/Programmers
Experienced in writing detailed systems and programming specifications and able to deal with first time users in an overseas environment.

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Who can cope with challenging projects within this Software House. Languages are immaterial although much of the work is based on Minis and a knowledge of BASIC would be an advantage.

Generous overseas allowances and accommodation are available whilst working abroad.

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27/17

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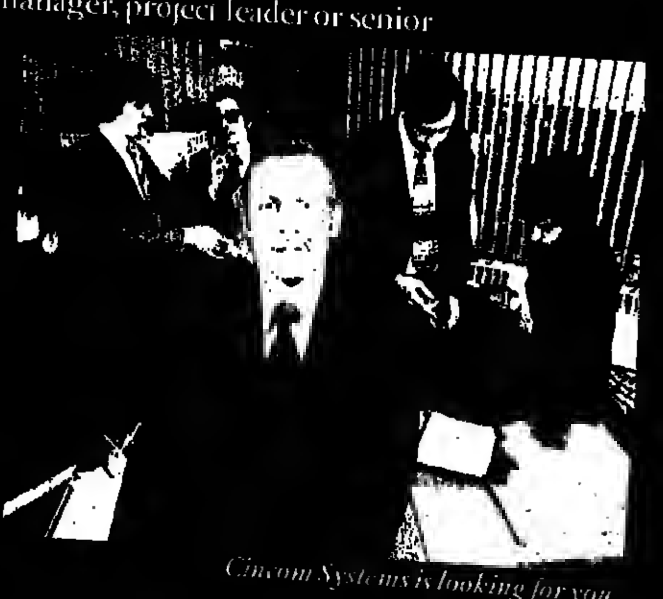
If you are already a successful salesman within the data processing industry, or feel you could be, we would like to talk to you about high salaries with the industry leader; about a big company benefit package; about possibilities for contact with the most important and largest enterprises in the U.K. and Europe. Above all, about promotion opportunities within the fastest growing software organisation in Europe.



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If you possess some or all of the following experience, then by contacting us now you will be taking the first step towards gaining an outstanding career development opportunity.

PROJECT LEADERS/ANALYSTS

1. The successful candidates for this role are likely to be currently working in a Systems Team engaged in the design of commercially based applications with some experience of leading projects.
2. A sound programming backgound preferably gained from working with medium/large mainframes will be sought.

ANALYSTS/PROGRAMMERS

1. Programmers with experience in Cobol, PL/1 or Assembler languages who have, or wish to have, systems involvement will be given the opportunity to implement small projects.
2. If you are currently a senior Progremmer working with mainframe or mini hardware, and wish to develop into systems work, you should apply.

CONTACT US NOW EITHER BY TELEPHONE OR IN WRITING SO THAT WE CAN ARRANGE FOR EARLY INTERVIEWS TO TAKE PLACE EITHER IN LONDON OR THE SOUTH.

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The Group operates ICL mainframes throughout its network comprising both 1900 and 2904 systems. A triple 2960 configuration is scheduled for delivery during 1979 at the Group Head Office in Manchester.

An attractive salary in the region of the figure quoted will be offered plus the usual fringe benefits expected of a leading National Organisation. Contact: P.J. Cropper, General Manager, CWS Computer Services, New Century House, Manchester, M60 4ES. Tel: 061-834 1212 ext. 6820 (office hours) 062-583 789 (evenings).

co op COMPUTER SERVICES..
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CWS Computer Services
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Tel: 0682 384107

CWS. Computer Services
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Tel: 0632 406321

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Tel: 0473 78616

CWS Computer Services
100 Morrison Street
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Tel: 041-429 2100

CWS Computer Services
Stratford House,
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Tel: 048-68-28212/3

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SPL's subsidiary in the Netherlands continues to grow fast and now needs more Computer Professionals.

We need

* A minimum of 2 years programming experience

and either

* a good working knowledge of any major international mini-computer such as DEC PDP11 or Data General Nova.

or

* Practical experience of systems software work on any small computing equipment particularly in the areas of I/O handling, disc monitors, assemblers or high level language compilers

or

* Experience of industrial systems applications based on mini or micro computers

The total salary package will be very attractive to people at present working in the U.K. and will be in the range of £10,000 to £12,000 upwards. Applications from Dutch Nationals and others working outside the U.K. will be welcome.

If your experience does not fit these requirements but you are interested in opportunities or working overseas with a major British software house please contact us anyway.

Please write or phone:
Alan Taylor, Resources Manager
SPL International
12-14 Windmill Street, London W1P 1HF
01-636 7833 or phone direct Utrecht 315534

SPL NEDERLAND BV.

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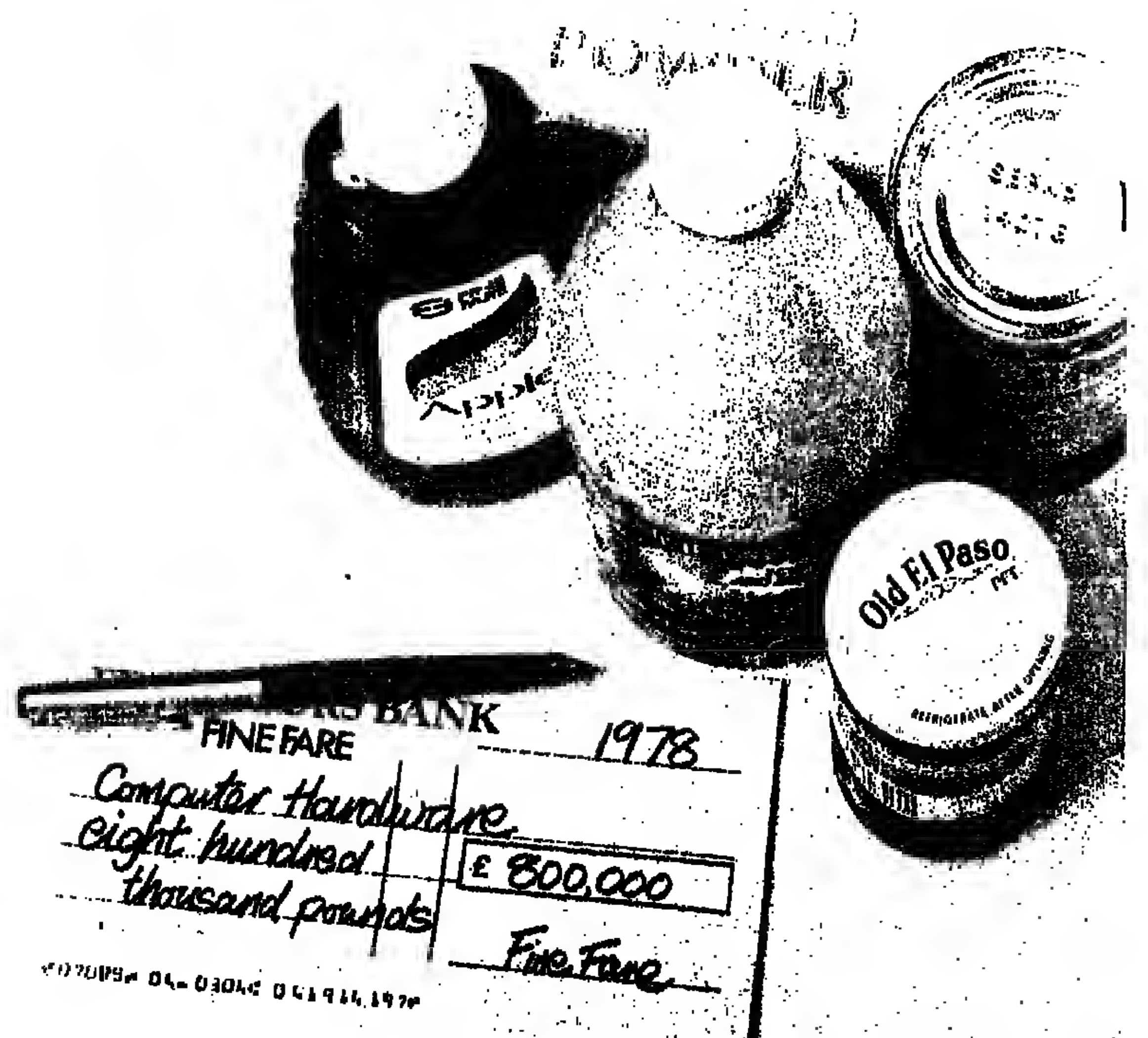

Welwyn Garden City

Senior Analyst/Programmers (Team Leaders) £5,450 - £6,150

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Phone Welwyn Garden City (07073) 28140

Evenings from 7.30 p.m. and Weekends

Stephen Hill Head Office Systems Manager
Stevenage (0438) 811329

Mike Bradley Distribution Systems Manager
Hitchin (0462) 4086

Cedric Hopkins Computer Services
Manager Cambridge (0223) 870925

If you prefer, write giving brief career details to Cedric Hopkins at Fine Fare Ltd., Gate House, Fretherne Road, Welwyn Garden City, Herts. AL8 6NB.

WE GIVE COMPUTER PEOPLE FOOD FOR THOUGHT

FINE FARE

COMPUTER WEEKLY INTERNATIONAL JULY 13th

The next issue of Computer Weekly will be the International Edition.

Advertisers are reminded that our readership will be increased to over 95,000 worldwide.

To secure space in this important issue contact

John Farrar on 01-261 8098
Copy deadline Monday, July 10th

Northern Regional Health Authority

Computer Programmers

The computer services for the region are centralised at the Authority's Headquarters at Walkergate, Newcastle upon Tyne.

The work carried out includes hospital, nursing, financial, administrative, works and community health systems together with experimental projects involving the use of terminals.

The modern computer centre contains a 96K 1904S running under George 3. Techniques used include on line program development via VDUs.

A 37 hour flexible working week is in operation. We require

1 Senior Programmer
(Scale 9) £4959-£6025

A minimum of 5 years' COBOL experience is required, some of which should have been in a supervisory capacity. A knowledge of PLAN would also be an advantage.

1 Programmer
(Scale 4) £4421-£5326

A minimum of 2 years' COBOL experience is required for this post.

New Entrants to the service will normally start at the minimum of the scale. Application forms and job descriptions available from Regional Personnel Officer, Northern Regional Health Authority, Benfield Road, Walkergate, NEWCASTLE UPON TYNE NE6 4PY.

Closing date 20 July 1978.

Please specify which post you wish to apply for.

SOCIAL AND COMMUNITY PLANNING RESEARCH

PROGRAMMERS TO £5,000

SCPR, an independent research institute, wishes to expand its small computing team. You would organise the computing phase of a series of research projects, writing programs for data validation, tabulation and statistical analysis and liaising with research staff. Experience in this field is not essential provided you can adapt quickly. The main requirement is an ability to organise your own work so as to deliver results on time, on budget and to exceptional standards.

A prime 400 computer is used via interactive terminals and most programs are written in a specialised survey language, quickly mastered by those with general programming experience. Experience of statistical packages, such as SPSS, would also be an advantage. Starting salary will depend mainly on age and experience. Other benefits include a nine-day fortnight and 4 weeks' holidays.

Apply in writing giving details of education, experience and current position and salary to

Steven Eldar
Technical Director Community
Social and Community Planning Research
16 Duncan Terrace
London N1 8BZ

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Areas Preferred First Choice .... Second Choice ....

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THE SALES BIT

Start with the phone operator

SALESMEN will often hear the old selling adage, "start at the top," but, despite this heartfelt plea, will more often than not commence their selling cycle at whatever level fate inflicts upon them.

In practice, it is certainly best for a salesman to start his selling at the chief executive level wherever possible, but it is generally advantageous for the very first contact to be at a much lower level in the hierarchical league table, namely the telephone operator.

The importance of being well prepared before every stage of the sales cycle has been emphasised in this column many times, and preparation for the first contact is probably the most crucial event of all. The salesman can collect a vast array of company information from Dunn and Bradstreet, Kompass and The Stock Exchange Yearbook, but they have little to contribute when the salesman needs answers to questions like "Which is the best day to catch the financial director?" or "What is the name of the new managing director?"

When it comes to information on organisation, names, locations, products and habits of all kinds, a salesman's best friend is his prospect's telephone operator.

If the salesman wants to be sure he gets the MD's name and initials right, as well as the company name and address, just ask the telephone operator. She will also tell you the best times to catch him, as well as the names of his closest aides, and if you are really charming she might even give you an outline of the company's primary products and markets. Be sure to ask her about the company's current involvement with computers — she will almost certainly have some idea of the situation.

In most organisations, the person who has the greatest amount of verbal interaction with the largest number of people is the telephone operator. Very often she also has contact with the secretaries of senior executives, so she tends to know more about what is happening within the company at the people level than anyone else, including the MD. So, not only at the beginning of the sales negotiation, but also at many subsequent stages, the telephone operator can be the salesman's greatest ally.

An essential fact to bear in mind is that telephone operators, secretaries, etc, do not generally provide helpful information as a result of being "chatted-up." I have seen many salesmen at work in this respect and most efforts have been pathetic. For every Sean Connery employed in selling within the computer industry, there are probably 50 Woody Allens! Like most aspects of selling, there is only one reliable approach and that is based on truth and common sense.

The first phase is a simple request for assistance. "I wonder if you can help me please? I believe you are the person most likely to be able to provide the assistance I need" — or words to that effect.

People like to help. It is a compliment to be asked. Just think how you react when people ask you for assistance. It is an ego boost to which most people respond altruistically. "I need your help!" has an echo of chivalry — maidens and dragons and things.

The second phase is where most salesmen get it wrong. They become devious rather than asking for the information they really need. If someone is going to help you they are best fitted to do so if they know exactly what you need and why you want it. It really is an acceptable approach to ask "Can you give me the name of your managing director please, I want to sell him a computer. Do you know if you already have one? Do you have any idea what it is used for, what make it is and who is in charge of it?"

The direct and truthful approach will tend to generate much more information than contrived approaches such as "I am writing a letter to your managing director and I wondered if you could ..." "I have been to your company before but I've forgotten ..." or even "What's the weather like at your end?"

TRADER

PRODUCT NOTES

A RANGE of vacuum column tape drives have been introduced by Calcomp as the 900X series. This includes a model with an integral Zilog Z80 microprocessor which controls power switching to various components of the drive, reducing the amount of power consumed, heat and noise.

The speeds of the 900X drives range from 37.5 to 125 ips, data densities go up to 1,600 bpi and the tape reels handled can have diameters of 7, 8½ or 10½ inches. A hollow casing in the 900X drives connects the vacuum chamber to the blower and eliminates the need for hoses.

The 900X drives are manufactured in the US by Cipher Data Products of San Diego, California; and Calcomp has the exclusive rights to market them in Europe along with a range of servo arm tape drives built by Cipher.

Calcomp Ltd (CW), Cory House, The Ring, Bracknell, RG12 1ER. Tel: Bracknell (0344) 50211.

Puzzler

THE sheer width of the problem is in fact somewhat artificial, since SEVENTY has been tacked on merely to create a tenth letter (Y), so as to accommodate all ten digits in the classic tradition. So the task boils down to solving the smaller sum THREE + TWO + ONE = SEVEN.

The basic solution is 310172529811 + 264 + 471 + 471 = 310172531017. Two alternative possibilities for the N-O pair mean that this answer is not, however, unique.

The response from the computer industry to the launch of Gemini recruitment has been tremendous. As a result we have already obtained an extensive list of clients, currently seeking experienced staff at all levels.

RATHER THAN LIST ALL OUR CLIENT VACANCIES
YOU TELL US YOUR REQUIREMENTS
RING IAN BACON NOW

Let the professionals match your requirements with the vacancies.

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£4,500-£5,500 +

PDP11 RSX11 Assembler gained in a real time industrial environment.

SENIOR PROGRAMMER/ PROJECT LEADER £5,000-£5,500 +

Solid PDP 11 programming background in a process control environment with the ability to control small in-house project teams.

PROGRAMMER £4,000-£4,500

Preferably with Intel Assembler (PLM) experience on process control applications but applicants with a strong micros background will be considered.

Ian Bacon, Gemini Computer Systems Ltd, [illegible]

GEMINI Recruitment

THE COMMERCIAL DIVISION OF GEMINI REQUIRE:

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Any hardware experienced programmers and systems analysts — this is your opportunity to work for Gemini clients in the UK and for the CAP/Gemini/Sogeti Group clients in Europe and the USA.

For preliminary discussion contact Ian Bacon.

Ian Bacon, Gemini Computer Systems Ltd, [illegible]

GEMINI Recruitment

University of Essex

DEC system-10

Systems Programmer

in the Department of Computer Science
Computing Service

Applications for the post of Systems Programmer in Grade Computer Officer 1A (salary scale £3,660-£6,178) are invited. Applicants should have a sound background in the theory and practice of operating systems. The successful applicant will also be fluent in assembly language. Interests in distributed processing systems, micro-processors and computer networks would be a distinct advantage.

The successful applicant will join an established Programming Group, which has responsibility for all aspects of software maintenance and development on the University's Service machine. This is a DECsystem-10/70 providing an extensive Timesharing and Batch service.

Applications (six copies) including a curriculum vitae and the names and addresses of two referees, should reach the Registrar (AG/39/CW), University of Essex, Wivenhoe Park, Colchester CO4 3SQ, from whom further particulars may be obtained by July 20, 1978.

Burroughs Software Programmer

WOKING : £5,225

Due to internal promotion we have an opportunity for a Software Programmer to take responsibility for, and to develop, a wide range of in-house software utilities.

Candidates with Burroughs experience should ideally have a sound knowledge of Cobol, a working knowledge of Assembler and have worked in a data communications environment.

Company benefits include flexitime, free lunches and modern working conditions.

For an application form please contact:

Miss M. Baldock, Personnel Officer
B.A.T. (U.K. and Export) Ltd.
Export House, Woking, Surrey
Telephone: Woking 78111

HONG KONG POLYTECHNIC
Department of Computing Science

Applications are invited at Principal Lecturer, Senior Lecturer and Lecturer levels for the Department of Computing Science at the Hong Kong Polytechnic. The Department offers courses leading to a Diploma in Computing Studies, a Higher Diploma in Computing Studies and a Higher Diploma in Systems Analysis. A proposal to offer more advanced work leading to an Associateship in Computing Studies is now under consideration.

The Department's own courses are, at present, commercially oriented and emphasis is placed on practical work. Students are required to spend a minimum of 15 weeks in a local DP department as an integral part of their course, in addition to undertaking projects and case study work. From October this year the courses will be offered under a credit-unit system.

The Polytechnic shares computer facilities with the 2 local Universities. Substantial batch processing facilities are available at all 3 institutions and present developments will facilitate the sharing of resources. In addition, at present 100 interactive terminals are available on the Polytechnic's campus alone, and it is planned that this figure will rise to approximately 300 by 1980/81.

Successful applicants will have expertise in one or more of the following areas: Advanced COBOL, Advanced Systems Analysis, Systems Programming, Real Time Systems, Project Management and Control, Data Base Management Systems, Advanced Management Information Systems and Computer Organisation.

General Qualification for Appointment

Principal Lecturer: (a) a degree or professional qualification; and (b) an advanced specialist qualification or extensive experience in a specialised field, and (c) substantial teaching and industrial/commercial experience, and (d) proven administrative ability.

Senior Lecturer: (a) a degree or professional qualification, plus preferably an advanced specialist qualification, and (b) at least five years professional experience; and (c) substantial teaching and/or industrial/commercial experience (about 3 additional years), and (d) proven administrative ability.

Lecturer: (a) a degree or professional qualification or at least a Higher Technician qualification in the appropriate field of study; and (b) at least five years professional or industrial/commercial experience or at least three years teaching experience or a suitable combination of professional and teaching experience.

SALARY SCALES
Principal Lecturer HK$91 740 to HK$113 340 p.a. by 5 increments
Senior Lecturer HK$74 460 to HK$100 380 p.a. by 6 increments
Lecturer HK$40 920 to HK$73 980 p.a. by 11 increments
Note £1 = HK$8.68 on 16th June 1978
(Commencing salary will be commensurate with qualifications and experience)

CONDITIONS OF SERVICE

Appointment will be on two-year gratuity bearing contract terms initially. Thereafter suitable appointees may be offered further contracts or superannuable terms of service at the discretion of the Polytechnic. Benefits include long leave, free passages, subsidised accommodation, medical and dental treatment, children's education allowance, and a terminal gratuity equal to 20% of basic salary received over entire contract period.

Application forms and further information are obtainable from the General Secretary, Hong Kong Polytechnic, Hung Hom, Kowloon, Hong Kong. Completed application forms should be returned by July 20th, 1978.

MANAGEMENT POTENTIAL
ANALYSTS & PROGRAMMERS to 6.5k
SURREY, SUSSEX, MIDDX., BERKS

Several of our client Companies have advised us that they require Analysts and Programmers with management potential.

The equipment range covers ICL 1900 and 2900 series, IBM 360/370, IBM System 3, Burroughs, Honeywell and PDP11 whilst the languages include COBOL, PLAN, ASSEMBLER, PL1, RPG and FORTRAN.

Our specialised experience and close contact with leading client companies in the computer field enable us to give you expert personal [illegible] guidance about nearly every opportunity in the area of your [illegible].

[illegible] phone us and ask for the information — what could be easier?

[illegible] A.B. Executive (Weybridge) 0932 41221 ([illegible])

UNIVERSITY OF BIRMINGHAM
Faculty of Education
DEPARTMENT OF CURRICULUM STUDIES

POST OF RESEARCH FELLOW IN COMPUTER EDUCATION

Applications are invited from suitably qualified persons to work on a project to collect, and develop materials for a course in the use of the Computer in Education, to assist in the implementation of suitable computer packages and to initiate research into the use of the Computer at Secondary School level and with students and staff in the Faculty. Experience of work in schools, especially with interactive systems, would be desirable. The appointment is for two years preferably from 1 October, 1978, or as soon as possible thereafter.

Salary on scale £3,360 to £6,178 plus superannuation.

Further particulars from Assistant Registrar (Education), University of Birmingham, PO Box 363, Birmingham B15 2TT, to whom applications ([illegible] copies — overseas applicants, 3 copies) should be sent by 14 July, 1978.

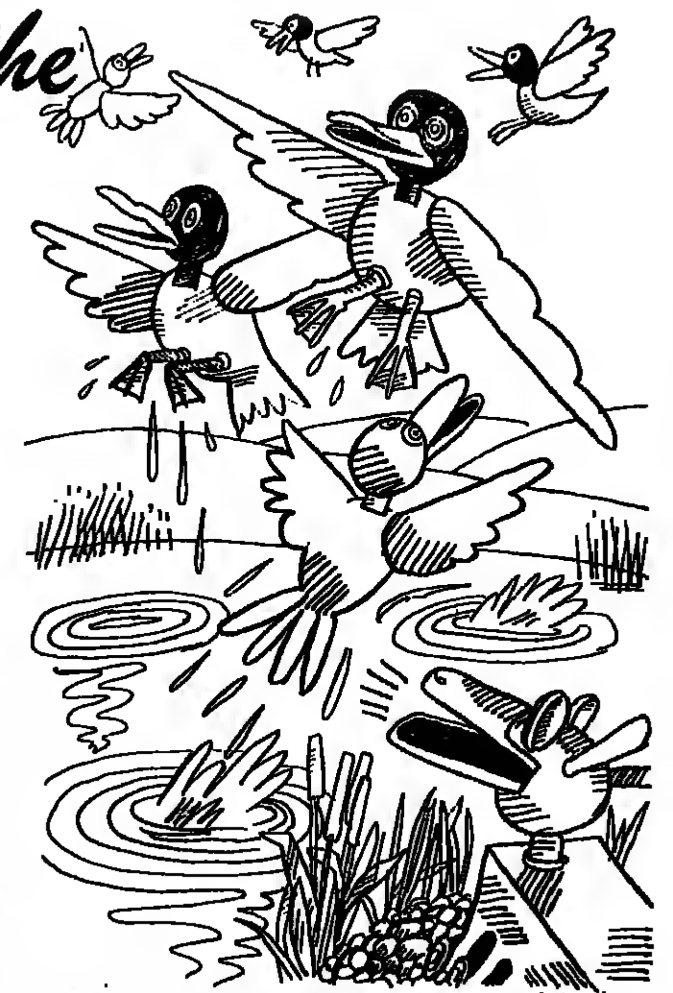
Metropolitan Borough of
WIRRAL

PROGRAMMER
£3861-£4214
(inclusive of supplements)

To join a team developing systems on a 1903T installation running under George 2+. Opportunity for a keen person with the right experience to be involved in developments concerned with financial and non-financial applications using on-line facilities and data base. Experience of PLAN in addition to COBOL an advantage.

Application forms from the Director of Finance, PO Box 2, Treasury Building, Cleveland Street, Birkenhead, Merseyside (telephone 051-647 7000 ext [illegible]) returnable by 14 July.

Ascii through the Logic Gate



An epic in 32K words, by Richard Forsyth

Block 5 (Love Is Just A Block Away)

While Hex and Cleo are asleep in their hideout high up in the Sierra Nueva, Sheriff Sprocket and his deputy meet a sticky end for letting them go free.

WHEN Hex awoke it was already pitch dark and very cold, so cold that he turned on his metabolism booster. He raised himself onto his elbows and tried to look around.

"You all right?" came Cleo's voice out of the night. She had heard him stirring.

Hex turned towards the sound. "I'm fine. How are you?"

"Freezing."

He realized that she had given him back his greatcoat. "You should have kept this," he said. "It gets pretty cold up here once the sun goes down, and we must have slept all day and half way through the night."

"Some of us must have," said Cleo.

Hex rose and groped towards Ascii's motionless body. Before long Cleo saw two red lights coming toward her. "Let's get back in the tunnel," Hex proposed. "Ascii can warm it up for us."

They hung a makeshift curtain, consisting chiefly of Hex's coat, across the entrance to keep out the draught, then settled down to talk. Hex left Ascii glaring at the wall, lighting it to a dull red glow with the heat of his lasers.

"What we have to do," he announced, "is to find some supporters. On our own we are no match for the System; but if we can find some disgruntled androids to join us we could form a resistance cell."

"Well, I know my elder sister Lambda is pretty fed up, and she works at the San Guine research lab which is not too far from here. Why don't we go and get her?"

"We really want androids, who know their way around the System."

"She is an android," was Cleo's indignant reply. "So is her boyfriend, Zap: he's supposed to be a machine-code wizard. But he's always getting into trouble."

"Zap? You don't mean Zap Zappar, the logic bomber?"

"I think that's his name."

Hex was truly impressed. "You're talking about the Zap Zapper, telecommunications freak and programmer extraordinary — the one who wrote 'Schizophrenia divides and rules OK, on the central master accounts file. We could certainly do with someone like that. He's a legend in his own time. I'm surprised he's still at large."

"Well, they've confined him to some menial job — maintaining old Cobol programs, I believe — that's why he is so discontented."

"Great! Do you think they would agree to join us?"

"I'm sure I can persuade Lambda and I have a feeling that if she comes so will he."

"That's settled then," declared Hex with an air of finality, "we set off for San Guine tomorrow night."

"No. Let's go right away. This place gives me the creeps."

Hex peered out through a crack in the awning. It was already growing light. "What? Travel in broad daylight? You must be insane."

"We're on the run, aren't we? So we have to keep moving."

"Yes, but I could use the day to get Ascii really shipshape again. And I want some time to check out the microprocessor which Null gave me. It may have some very valuable information stored in it."

"We don't have time. If we just lie back and take it easy they'll catch up with us. We're only a day's march away from Sprocket's Hole."

"It's all very well for you, but my alpha ratio is approaching 0.9. The critical loading is 0.95 and if it goes above 0.96 my brain will seize up. I wasn't designed for this sort of existence; I'll have to implement some forgetting routines."

"Huh," expostulated Cleo scornfully, "I thought you mechanical men were so superior. I'm glad I never got cybernated."

Stung by this taunt, Hex was about to make an insulting remark about her place in the evolutionary scale when he checked the impulse, realising that they could not afford anger. "Look," he compromised, "I'll just do the very minimum to get Ascii fixed up again and offload some of my temporary files. Then we'll go, even if it's still light."

Cleo agreed without further ado, and he set to work on his bionic dog.

One by one, Hex went through the diagnostic routines, while Cleo watched over his shoulder. When he was finally satisfied that every circuit board was functioning correctly he rolled Ascii outside and asked Cleo to stand clear. He began the cold-start procedure by switching on the power supply and pressing the reload button.

Ascii cocked one ear, sniffed the air and went bounding down towards the pond, where some birds had gathered to wash themselves. With a great squawking the whole flock took to the air and flew off. Ascii stood under the monkey-puzzle tree barking up at a pair which had taken refuge in its branches.

"He looks all right," said Hex. "Now I'll just do a quick file purge and then we'll be ready to go."

Soon they were clambering up the steep tunnel. With a little help from Ascii, pushing at the rear, they emerged at length from their secret resting place, somewhat breathless and very muddy. It was still early morning.

After they had been walking down the hill for a while in silence Cleo asked, apropos of nothing, "What's Simula like?"

"Eh?"

"Simula. What's she like?"

Hex was caught off balance. "Well," he began, "she's a block-structured high-level general-purpose compiler producing relocatable object code . . ."

"No. I mean what does she look like?"

"She has blue eyes and blonde hair. She's Scandinavian. Why? It means nothing to you. Why are you so curious?"

"You kept calling her name in your sleep, that's all. It made me interested."

"Let's talk about something else."

Have we heard the last of Simula? Don't bet on it.

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BOOKS

'Go out and buy it—today'

Project management in data processing, by Susan Wooldridge, 178 pp. £10.50. Petrocelli/Charter.

FOR those who have read 'The Computer Survival Handbook', Miss Wooldridge's style will be familiar. This latest book is in a more serious vein, but is written in a simple and attractive manner.

Unlike the turgid tomes on the "science" of "management", Miss Wooldridge takes a pragmatic view of the real world of project control. It is easy to see that she has extensive practical experience of her subject, and although paying intelligent attention to the theory of organisation systems, the main emphasis of the book is on day-to-day practical problems and their solutions.

Although many of the points made are plain good sense, this in no way detracts from their value. Miss Wooldridge has a keen understanding of the seemingly trivial elements in the project leadership role which, if ignored, gnaw away and turn into major crises.

The subject matter is aimed primarily at those about to assume responsibility in systems implementation functions. As such, it succeeds admirably, and should be required reading.

It is liberally, though not excessively, illustrated with comprehensive charts and diagrams. It is also refreshingly peppered with tricks of the trade.

Although the usual subjects are succinctly covered, the author provides other very helpful chapters on dealing with project delays, trouble-shooting and estimating — all in eminently practical ways. An irresistible example of the unstuffy presentation (dealing with estimating) is: "Intuitive estimating means hefting the specs, seeing which way the wind is blowing, tossing a coin and saying 'two weeks'. At worst it is on a par with studying the entrails of a chicken, at its best it can produce more accurate estimates than (any) other methods."

O'Connell

Go out and buy it. Today.

SEAN O'CONNELL

Clarity, crispness and accuracy

Computer methods for mathematical computations, by G. Forsythe, M. A. Malcolm and C. Moler. 259pp. £12.80. Prentice-Hall International.

THIS book, the authors state, was developed from the courses in numerical methods taught by them in the Universities of Stanford, Waterloo and New Mexico. Part of the material may be covered in a term or the full book over a year.

In one sense the book is a sequel to an earlier publication written by two of the authors (Forsythe and Moler in 1967); the book is also the last one which contains a contribution by Professor Forsythe (he died in 1972 at the relatively early age of 55).

The material in this book is presented with clarity, crispness and accuracy; at the same time the style is informal and absorbs the reader.

It is well known in schools of mathematics that numerical analysts do not get involved in detailed machine representation of their numbers and computer scientists have nothing to do with numbers! No wonder one famous American mathematician refused to travel in aeroplanes as these were designed (inaccurately from his point of view) using floating point numbers. The first topic discussed by the authors attacks this problem head on (Chapter 2 — Floating Point Computation).

The authors believe that mathematicians and analysts in industry use the techniques or the computer programs they came to know as students. Hence, the authors have taken care to provide some 10 useful subroutines in Fortran. These subroutines represent the state of the art in processing the 10 different problems for which these were designed in the first place.

I am sure that any school of mathematical studies will feel proud to claim that they have taught their combined first year course on numerical methods based entirely on this textbook.

Dr G. MITRA

Develops, expounds theoretical know-how

Information Systems Architecture, by Börje Langefors and Dr Bo Sundgren. 366pp. £16.65. Petrocelli-Charter (available through Van Nostrand).

THE authors (from the University of Stockholm) evidently have considerable theoretical experience in database design, judging from this textbook for students and users of information systems. The book may have suffered unfortunately in translation from Swedish: an impression is given that the translator would not use a simple word where two difficult ones would do. The authors also fall into the error of many numerate people in tending to use formulae to state what could often be more intelligibly expressed in a simple sentence.

The principles of data structures, entries and attributes are lucidly explained and built up to cover the whole of database design; it also clearly illustrates the virtual necessity of ignoring computing requirements when developing an information system.

Normally in books of this sort, a problem is expressed in simple terms, a solution proposed in principle and then expanded with due logical symbolism into a complete solution. The authors in this case appear to work backwards. Starting with symbolically expressed solutions they proceed to develop problems in outline which they can solve.

The whole field is nonetheless comprehensively covered. This book is bound to become a standard work of reference to practitioners of database design. It shows how to develop a complete system for a new user from scratch: but it needs an experienced user to follow it, and give effect to the solutions propounded.

The overall impression is that far from seeking to explain in simple terms how to develop systems, the authors have sought to expound on every complication so as to prove their depth of knowledge and give the book the status of a learned tome. In doing this they fulfil the function of a university faculty: develop and expound theoretical knowledge, leaving its practical application to industry and commerce, where users will lift out enough to meet their immediate requirements from the wealth of detail provided.

J. W. MITCHELL

Complex study

The Complexity of Computational Problem Solving, edited by R. S. Anderssen and R. P. Brent. 252 pp. £4.70. Prentice-Hall International.

THE title of this book I found rather confusing and on detailed investigation the contents also turned out to be unstructured and equally bewildering. "Computational complexity" has become an accepted field of analysis of finding upper and lower bounds (in some notional time measure) to various computational algorithms.

The book, which consists of various loosely knit papers, does not deal with this problem at all. The volume is an edited proceedings of the conference (1974) held at the Australian National University on this topic, and as far as I can make out anybody who had something to write home about has done so! Thus, papers on filter designs, linear programming and philosophical treatises on program composition and program comprehension, etc have all been collated in one volume.

Dr G. MITRA